REQUEST FOR REDESIGNATION AND MAINTENANCE PLAN FOR OZONE ATTAINMENT IN THE 8-HOUR OZONE BASIC NONATTAINMENT AREA

Central Indiana Area

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The Indiana Department of Environmental Management

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REQUEST FOR REDESIGNATION AND MAINTENANCE PLAN FOR OZONE ATTAINMENT IN THE 8-HOUR OZONE BASIC NONATTAINMENT AREA

CENTRAL INDIANA AREA

1.0 INTRODUCTION

This document supports Indiana's request that Boone, Hamilton, Hancock, Hendricks, Johnson, Madison, Marion, Morgan, and Shelby Counties (herein referred to as the "Central Indiana Area"), be redesignated from nonattainment to attainment of the 8-hour ozone standard. The Central Indiana Area has recorded three (3) years of complete, quality assured ambient air quality monitoring data for the years 2004 through 2006 demonstrating attainment with the 8-hour ozone standard.

Section 107 of the Clean Air Act (CAA) establishes specific requirements to be met in order for an area to be considered for redesignation including:

(a) A determination that the area has attained the 8-hour ozone standard.
(b) An approved State Implementation Plan (SIP) for the area under Section 110(k).
(c) A determination that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP and other federal requirements.
(d) A fully approved maintenance plan under Section 175A.
(e) A determination that all Section 110 and Part D requirements have been met.

This document addresses each of these requirements, and provides additional information to support continued compliance with the 8-hour ozone standard.

1.1 Background

The Clean Air Act Amendments of 1990 (CAAA) required areas designated nonattainment for the National Ambient Air Quality Standard (NAAQS) for ozone to develop SIPs to expeditiously attain and maintain the standard. In 1997 the United States Environmental Protection Agency (U.S. EPA) revised the air quality standard for ozone replacing the 1979 1-hour standard with an 8-hour ozone standard set at 0.08 parts per million (ppm) (values below 0.085 ppm meet the standard, please see Section 3.2 for further clarification). The standard was challenged legally and upheld by the U.S. Supreme Court in February of 2001. The U.S. EPA designated areas under the 8-hour ozone standard on April 15, 2004 as attainment, nonattainment, or unclassifiable.

On April 15, 2004, U.S. EPA designated the Central Indiana Area Basic nonattainment and subject to the new 8-hour ozone requirements, including development of a plan to reduce volatile organic compound (VOC) and oxides of nitrogen (NO_x) emissions and a demonstration that the area will meet the 8-hour ozone standard for ozone by June 15, 2009.

The Central Indiana Area as defined in Sections 1.1 and 1.2 has not previously been subject to nonattainment area rulemakings. However, Marion County has been subject to nonattainment area rulemakings under the previous one-hour ozone standard. Marion County was redesignated to attainment and classified as maintenance under the one-hour ozone standard in 1994 with a maintenance plan horizon of 2006.

1.2 Geographical Description

The Central Indiana Area includes Boone, Hamilton, Hancock, Hendricks, Johnson, Madison, Marion, Morgan, and Shelby Counties and contains such cities as Anderson, Carmel, Greenfield, Greenwood, Indianapolis, Lebanon, Martinsville, and Shelbyville and such towns as Brownsburg, Cumberland, Fishers, Mooresville, Plainfield and Zionsville. This area is depicted in Figure 3.1.

1.3 Status of Air Quality

Ozone monitoring data for the most recent three (3) years, 2004 through 2006, demonstrates that air quality has met the NAAQS for ozone in the nonattainment area. This fact, accompanied by the permanent and enforceable reductions in emission levels discussed in Section 4.0, justifies a redesignation to attainment for the subject area based on Section 107(d)(3)(E) of the CAAA.

2.0 REQUIREMENTS FOR REDESIGNATION

2.1 General

Section 110 and Part D of the CAAA list a number of requirements that must be met by nonattainment areas prior to consideration for redesignation to attainment. In addition, U.S. EPA has published detailed guidance in a document entitled *Procedures for Processing Requests to Redesignate Areas to Attainment*, issued September 4, 1992, to Regional Air Directors. This document is hereafter referred to as "Redesignation Guidance". This Request for Redesignation and Maintenance Plan is based on the Redesignation Guidance, supplemented with additional guidance received from staff of the Regulatory Development Section of U.S. EPA Region V. The specific requirements for redesignation are listed below.

2.2 Ozone Monitoring 107(d)(3)(E)(i)

1) A demonstration that the NAAQS for ozone, as published in 40 CFR 50.4, has been attained. Ozone monitoring data must show that violations of the ambient standard are no longer occurring.

2) Ambient monitoring data quality assured in accordance with 40 CFR 58.10, recorded in the U.S. EPA Air Quality System (AQS) database, and available for public view.

3) A showing that the three-year average of the fourth highest values, based on data from all monitoring sites in the area or its affected downwind environs, are below 0.085 parts per million (ppm). This showing must rely on three (3) complete, consecutive calendar years of quality assured data.

4) A commitment that, once redesignated, the State will continue to operate an appropriate monitoring network to verify the maintenance of the attainment status.

2.3 Emission Inventory 107(d)(3)(E)(iii)

1) A comprehensive emission inventory of the precursors of ozone completed for the base year.

2) A projection of the emission inventory to a year at least 10 years following redesignation.

3) A demonstration that the projected level of emissions is sufficient to maintain the ozone standard.

4) A demonstration that improvement in air quality between the year violations occurred and the year attainment was achieved is based on permanent and enforceable emission reductions and not on temporary adverse economic conditions or unusually favorable meteorology.

5) Provisions for future annual updates of the inventory to enable tracking of the emission levels, including an annual emission statement from major sources.

2.4 Modeling Demonstration

While no modeling is required for redesignating ozone nonattainment areas, the Indiana Department of Environmental Management (IDEM) has evaluated the results of federal control-case modeling to demonstrate compliance with the standard will be maintained.

2.5 Controls and Regulations 107(d)(3)(E)(ii) & 107(d)(3)(E)(v)

1) A U.S. EPA-approved SIP control strategy that includes Reasonably Available Control Technology (RACT) requirements for existing stationary sources covered by Control Technology Guidelines (CTG) and non-CTG RACT for all major sources.

2) Evidence that control measures required in past ozone SIP revisions have been fully implemented.

3) Acceptable provisions to provide for new source review.

4) Assurances that existing controls will remain in effect after redesignation, unless the State demonstrates through photochemical modeling that the standard can be maintained without one (1) or more controls.

5) If appropriate, a commitment to adopt a requirement that all transportation plans conform with and are consistent with the SIP.

2.6 Corrective Actions for Potential Future Violations of the Standard

1) A commitment to submit a revised plan eight (8) years after redesignation.

2) A commitment to expeditiously enact and implement additional contingency control measures in response to exceeding specified predetermined levels (triggers) or in the event that future violations of the ambient standard occur.

3) A list of potential contingency measures that would be implemented in such an event.

4) A list of VOC and NO_x sources potentially subject to future controls.

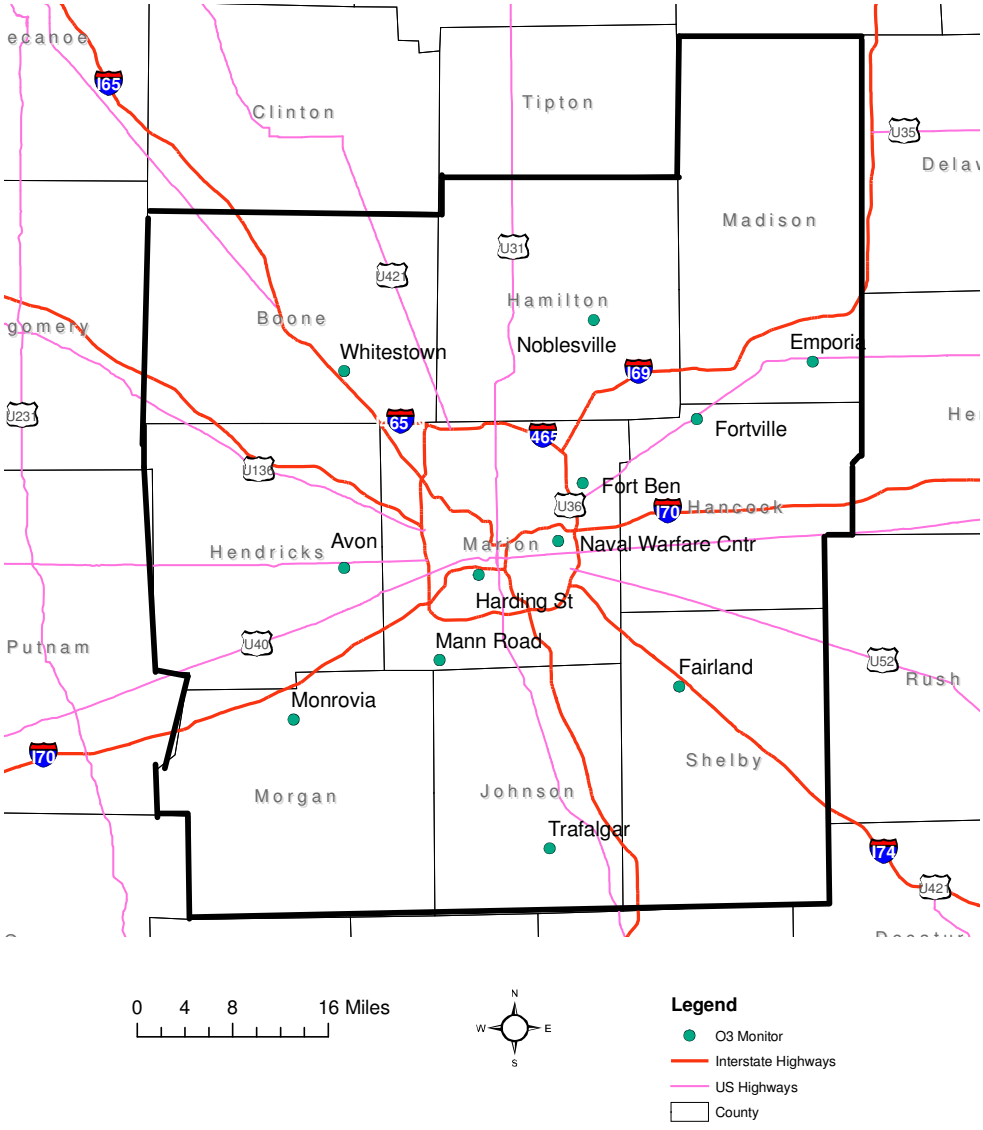
3.0 OZONE MONITORING

3.1 Ozone Monitoring Network

There are currently twelve monitors measuring ozone concentrations in this nonattainment area. These monitors are located as follows: Boone County (Whitestown, Indiana), Hamilton County (Noblesville, Indiana), Hancock (Fortville, Indiana), Hendricks (Avon, Indiana), Johnson (Trafalgar, Indiana), Madison (Emporia, Indiana), Marion (Fort Benjamin Harrison, Harding Street, Mann Road and National Air Warfare Center, Indianapolis, Indiana), Morgan (Monrovia, Indiana), and Shelby (Fairland, Indiana). The Emporia, Indiana and Naval Air Warfare Center monitors are currently operated by IDEM's Office of Air Quality (OAQ). The ten remaining monitors are currently operated by the City of Indianapolis' Office of Environmental Services. A listing of the monitors' four (4) highest readings from 2004 through 2006 are shown in Table 3.1 and were retrieved from the U.S. EPA's Air Quality System (AQS). The locations of the monitoring sites for this nonattainment area are shown on Figure 3.1.

Figure 3.1

Central Indiana Nonattainment Area



3.2 Ambient Ozone Monitoring Data

The following information is taken from U.S. EPA's "Guideline on Data Handling Conventions for the 8-Hour Ozone National Ambient Air Quality Standard (NAAQS)," EPA-454/R-98-017, December 1998.

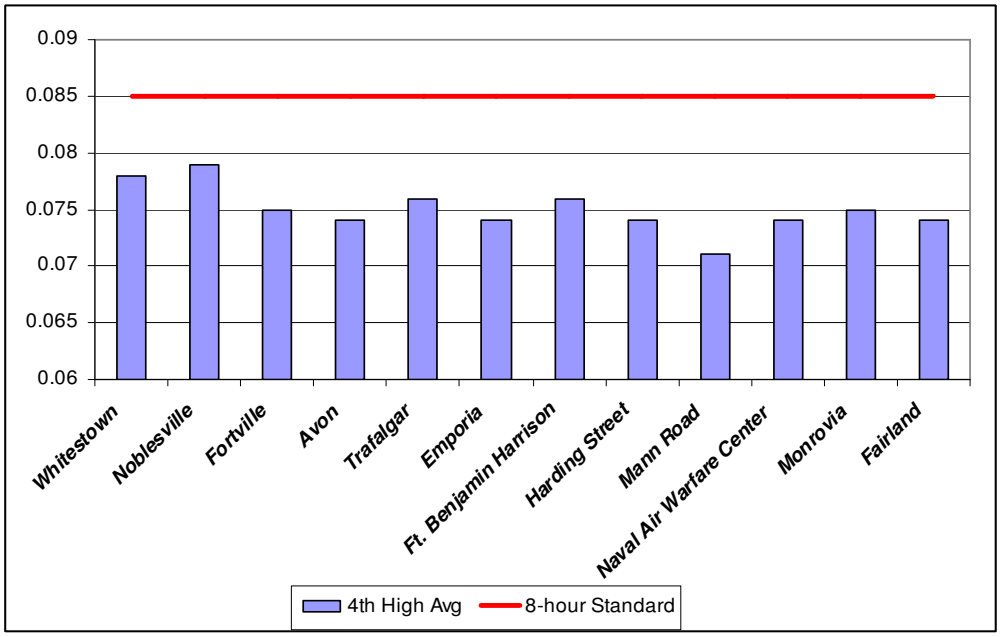
Three (3) complete years of ozone monitoring data are required to demonstrate attainment at a monitoring site. The 8-hour primary and secondary ozone ambient air quality standards are met at an ambient air quality monitoring site when the three (3) year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to 0.08 ppm. When this occurs, the site is said to be in attainment. Three (3) significant digits must be carried in the computations. Because the third decimal digit, in ppm, is rounded, 0.084 ppm is the largest concentration that is less than, or equal to 0.08 ppm. Therefore, for the purposes of this request, the 8-hour standard is considered to be 0.085 ppm. Values below 0.085 ppm meet the standard, values equal to or greater than 0.085 ppm exceed the standard. These data handling procedures are applied on an individual basis at each monitor in the area. An area is in compliance with the 8-hour ozone NAAQS if, and only if, this monitoring site meets the NAAQS. An individual site's three (3) year average of the annual fourth highest daily maximum 8-hour average ozone concentration is also called the site's *design value*. The air quality design value for the area is the highest design value among all sites in the area. Table 3.1 outlines the annual fourth highest values by site and the 2004 through 2006 design values for the twelve active ozone monitoring sites in the Central Indiana Area.

Table 3.1 Monitoring Data for the Central Indiana Area (Annual 4th High and 2004-2006 Design Values)

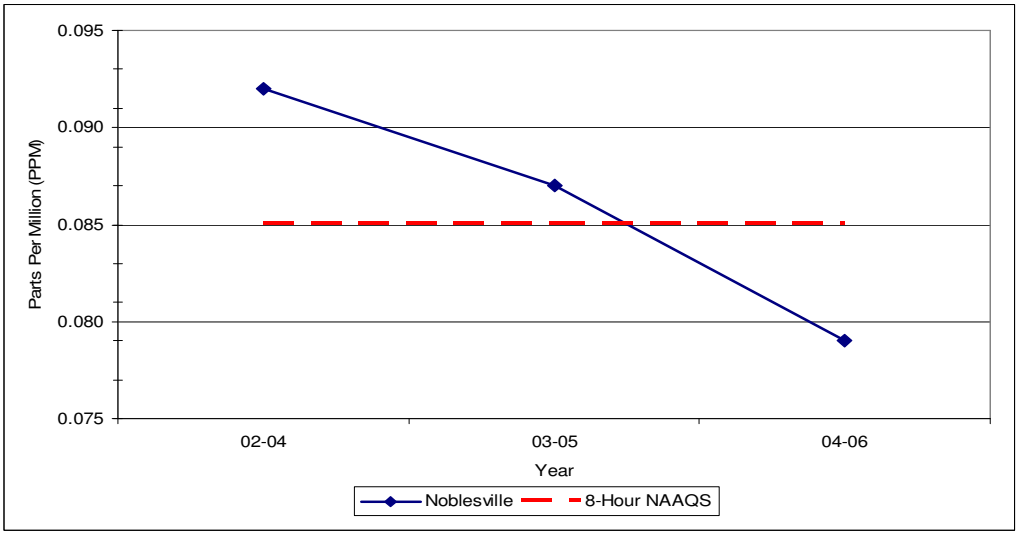
				Annual 4th High	2004-2006
SITE ID	**COUNTY**	**SITE NAME**	**YEAR**	**8-HR (ppm)**	**AVERAGE (ppm)**
18-011-0001	Boone	Whitestown	2004	0.072	
18-011-0001	Boone	Whitestown	2005	0.082	
18-011-0001	Boone	Whitestown	2006	0.080	**0.078**
18-057-1001	Hamilton	Noblesville	2004	0.075	
18-057-1001	Hamilton	Noblesville	2005	0.087	
18-057-1001	Hamilton	Noblesville	2006	0.077	**0.079**
18-059-0003	Hancock	Fortville	2004	0.072	
18-059-0003	Hancock	Fortville	2005	0.080	
18-059-0003	Hancock	Fortville	2006	0.075	**0.075**
18-063-0004	Hendricks	Avon	2004	0.071	
18-063-0004	Hendricks	Avon	2005	0.078	
18-063-0004	Hendricks	Avon	2006	0.073	**0.074**
18-081-0002	Johnson	Trafalgar	2004	0.073	
18-081-0002	Johnson	Trafalgar	2005	0.077	
18-081-0002	Johnson	Trafalgar	2006	0.078	**0.076**
18-095-0010	Madison	Emporia	2004	0.072	
18-095-0010	Madison	Emporia	2005	0.078	
18-095-0010	Madison	Emporia	2006	0.073	**0.074**
18-097-0050	Marion	Ft. Benjamin Harrison	2004	0.073	
18-097-0050	Marion	Ft. Benjamin Harrison	2005	0.080	
18-097-0050	Marion	Ft. Benjamin Harrison	2006	0.076	**0.076**
18-097-0057	Marion	Harding Street	2004	0.066	
18-097-0057	Marion	Harding Street	2005	0.081	
18-097-0057	Marion	Harding Street	2006	0.076	**0.074**
18-097-0042	Marion	Mann Road	2004	0.065	
18-097-0042	Marion	Mann Road	2005	0.076	
18-097-0042	Marion	Mann Road	2006	0.074	**0.071**
18-097-0073	Marion	Naval Air Warfare Center	2004	0.071	
18-097-0073	Marion	Naval Air Warfare Center	2005	0.080	
18-097-0073	Marion	Naval Air Warfare Center	2006	0.072	**0.074**
18-109-0005	Morgan	Monrovia	2004	0.072	
18-109-0005	Morgan	Monrovia	2005	0.078	
18-109-0005	Morgan	Monrovia	2006	0.077	**0.075**
18-145-0001	Shelby	Fairland	2004	0.071	
18-145-0001	Shelby	Fairland	2005	0.080	
18-145-0001	Shelby	Fairland	2006	0.073	**0.074**

The graph below visually demonstrates the design values for this nonattainment area.

Graph 3.1 Design Values for the Central Indiana Area Nonattainment Area 2004 through 2006



Graph 3.2 Trends in Central Indiana's 8-Hour Design Values 2002 through 2006



The Noblesville ozone monitoring station recorded the highest three year 8-hour ozone design values from 2002 through 2006 and is considered the controlling monitor for the entire Central Indiana non-attainment area during this timeframe. As such, Graph 3.2 shows the trend in design values over the past five years (most recent three 8-hour design values) at the Noblesville ozone monitoring site as it is representative of the entire Central Indiana non-attainment area.

A comprehensive list of the twelve ozone monitoring site's design values over this period is in Appendix A. The area's design values have recently trended downward as emissions have declined due to such programs as the Acid Rain program and cleaner automobiles and fuels both regionally and locally. U.S. EPA's rule to control nitrogen oxides from specific source categories (40 CFR Parts 51, 72, 75 and 96, published on October 17, 1998 and referred to as the "NO_x SIP Call") has significantly reduced emissions from large electric generating units (EGUs), industrial boilers, and cement kilns. Indiana's NO_x Rule was adopted on June 6, 2001 (326 IAC 10-3 and 10-4). An analysis of meteorological conditions and monitoring values is included in Section 7.0 and supports the conclusion that attainment of the standard as of 2006 is not the result of unusually favorable meteorological conditions. It is expected that this downward trend will continue as the above programs continue and the U.S. EPA Clean Air Interstate Rule is implemented.

3.3 Quality Assurance

IDEM has quality assured all data shown in Appendix A in accordance with 40 CFR 58.10 and the Indiana Quality Assurance Manual. IDEM has recorded the data in the AQS database and, thus, the data are available to the public.

3.4 Continued Monitoring

Indiana commits to continue monitoring ozone levels at the sites indicated in Table 3.1 and Appendix A. IDEM will consult with U.S. EPA Region V staff prior to making changes to the existing monitoring network, should changes become necessary in the future. IDEM will continue to quality assure the monitoring data to meet the requirements of 40 CFR 58. Connection to a central station and updates to the IDEM website[1] will provide real time availability of the data and knowledge of any exceedances. IDEM will enter all data into AQS on a timely basis in accordance with federal guidelines.

1 www.in.gov/idem/

4.0 EMISSION INVENTORY

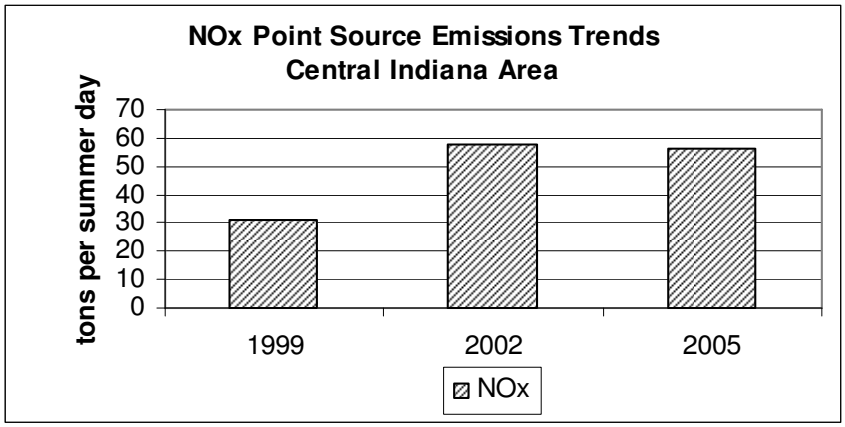
U.S. EPA's Redesignation Guidance requires the submittal of a comprehensive inventory of ozone precursor emissions (VOC and NO_x) representative of the year when the area achieves attainment of the ozone air quality standard. Indiana must also demonstrate that the improvement in air quality between the year that violations occurred and the year that attainment was achieved is based on permanent and enforceable emission reductions. Other emissions inventory related requirements: include a projection of the emission inventory to a year at least ten (10) years following redesignation; a demonstration that the projected level of emissions is sufficient to maintain the ozone standard; and a commitment to provide future updates of the inventory to enable tracking of emission levels during the ten (10) year maintenance period. The following subsections address each of these requirements. Photochemical modeling to support the NO_x SIP Call and IDEM's reclassification petition demonstrates that the Central Indiana Area is affected by overwhelming transport. Therefore, regional emission reductions affect ozone levels in the Central Indiana Area far more so than emission reductions within the area itself. Because of the significance of regional emissions reductions, Section 4.0 summarizes both regional and local emissions information.

4.1 Emission Trends

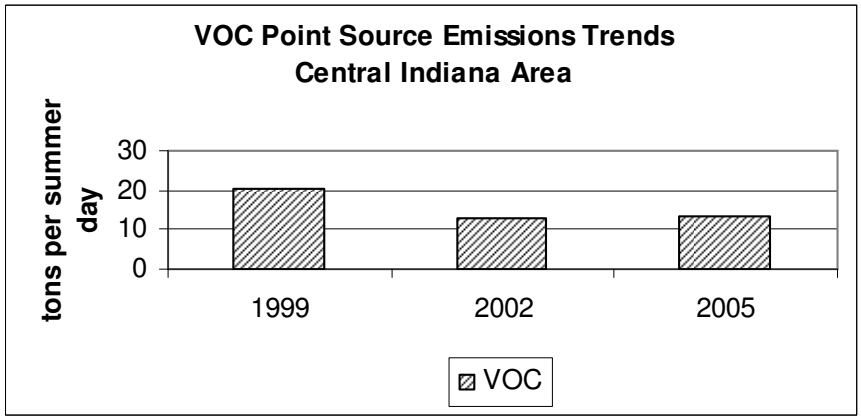
Point Sources

Graphs 4.1 and 4.2 show the trend in point source emissions of NO_x and VOC respectively that generally correspond to the years of monitored values referenced in this petition. The point source data are taken from Indiana's annual emissions reporting program. The Central Indiana area does not have a substantial number of NO_x point sources and even though point source emissions have increased modestly over this time period (see Graph 4.1), total anthropogenic NO_x emissions have decreased (see Graph 4.4). Regional NO_x emission reductions affect ozone levels in the Central Indiana Area far more so than NO_x emission reductions within the area itself. As Graph 4.3 illustrates, statewide NO_x emissions from electric generating units have decreased substantially during this time period.

Graph 4.1 Central Indiana Area NO_x Point Source Emissions Trends 1999 through 2005



Graph 4.2 Central Indiana Area VOC Point Source Emissions Trends 1999 through 2005



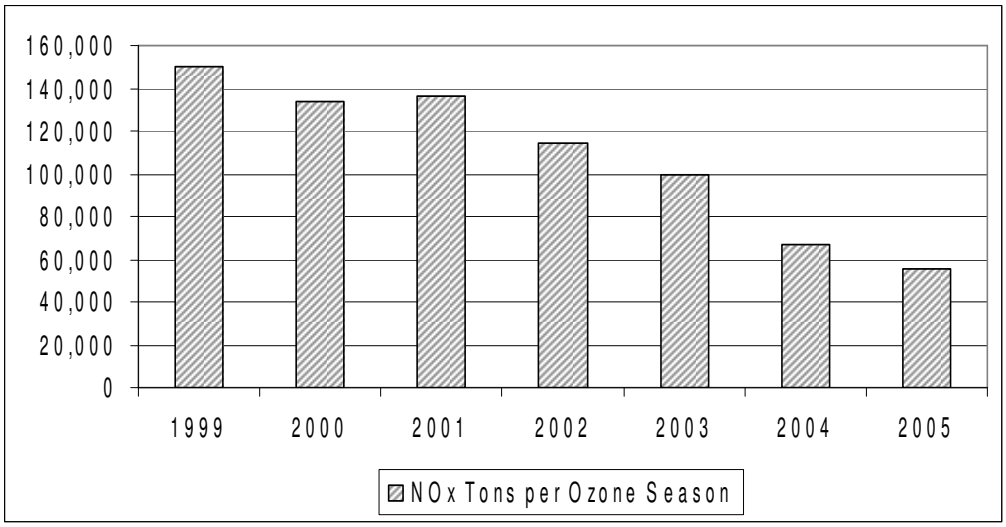
EGU Sources

Graph 4.3 depicts the trends in statewide NO_x emissions from EGUs. While ozone and its precursors are transported into this region from outside the area, this information does provide some indication of the impact that Indiana EGU sources may have on the nonattainment area. The emissions are decreasing substantially in response to national programs affecting all EGUs such as the Acid Rain program and the NO_x SIP Call. Other sectors of the inventory also impact ozone formation, but large regional sources such as EGUs have a substantial impact on the formation of ozone.

These data were taken from U.S. EPA's Clean Air Markets database[2]. Data are available sooner for these units than other point sources in the inventory because of the NO_x SIP Call budget and trading requirements. Information from 2003 is significant because some EGUs started operation of their NO_x SIP Call controls in order to generate Early Reduction Credits for their future year NO_x budgets. The first season of the SIP Call budget period began May 31, 2004.

As part of the NO_x SIP Call, the states were required to adopt into their rules a budget for all large EGUs. Indiana's budget is referenced in 326 IAC 10-4. The budget represents a statewide cap on NO_x emissions. Although each unit is allocated emissions based upon historic heat input, utilities can meet this budget by over-controlling certain units or purchasing credits from the market to account for overages at other units. To summarize, NO_x emissions have dramatically decreased over the years represented on these graphs. These emissions, capped by the state rule, should remain at least this low through the maintenance period covered by this request.

Graph 4.3 Statewide NO_x Emissions from Electric Generating Units 1999 through 2005

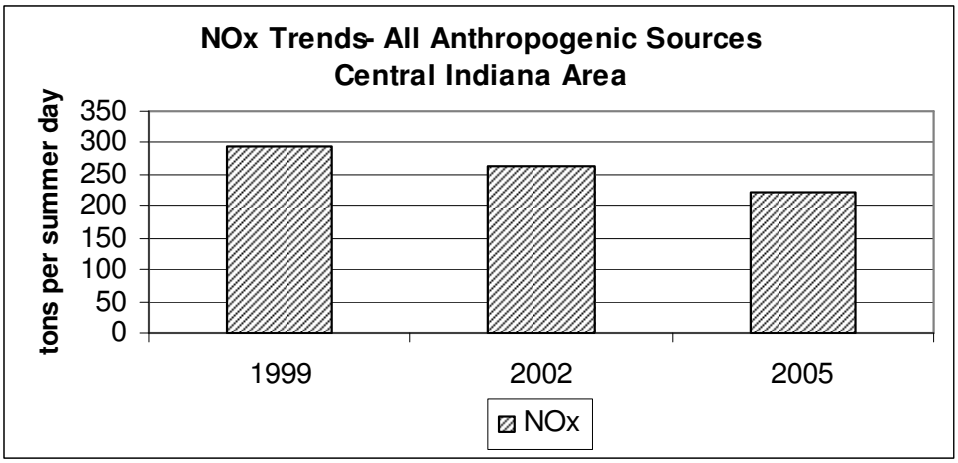


All Anthropogenic Sources

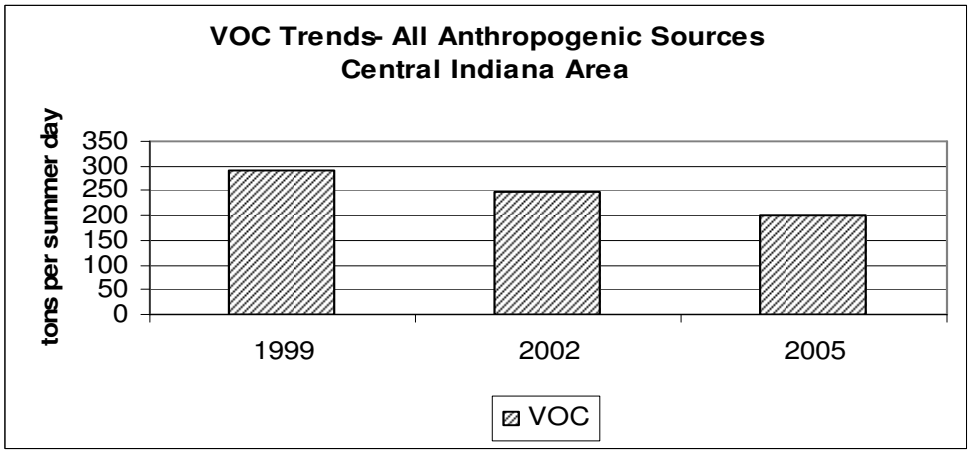
Periodic inventories, which include emissions from all sectors (mobile, area, non-road, and point sources) were prepared for 1999, 2002 and 2005. Graphs 4.4 and 4.5 show the trends for the total emissions for all anthropogenic source categories in these years, which also roughly follow the years of monitored trends discussed in Section 3. Graphs and data tables of emissions from each source category are available in Appendix B.

[2] http://www.epa.gov/airmarkets

Graph 4.4 NO_x Emissions Trends, 1999 through 2005, All Sources in the Central Indiana Area



Graph 4.5 VOC Emissions Trends, 1999 through 2005, All Sources in the Central Indiana Area



4.2 Base Year Inventory

IDEM prepared a comprehensive inventory for the Central Indiana Area, including area, mobile, and point sources for precursors of ozone (volatile organic compounds and nitrogen oxides) for base year 2005 (the middle year of the area's attainment design value).

- Area sources were grown from the Indiana 2002 periodic inventory submitted to U.S. EPA.

- Mobile source emissions were calculated from MOBILE6.2 produced emission factors and data extracted from the region's travel-demand model.
- Point source information was compiled from IDEM's annual emissions statement database..
- Biogenic emissions are not included in these summaries.
- Nonroad emissions were grown from the 2002 National Emissions Inventory (NEI). To address concerns about the accuracy of some of the categories in U.S. EPA's nonroad emissions model, the Lake Michigan Air Directors' Consortium (LADCO) (Midwest Regional Planning Organization), contracted with two (2) companies to review the base data and make recommendations. One of the contractors also estimated emissions for two (2) nonroad categories not included in U.S. EPA's nonroad model. Emissions were estimated for commercial marine vessels and railroads. Recreational motorboat population and spatial surrogates (used to assign emissions to each) were significantly updated. The populations for the construction equipment category were reviewed and updated based upon surveys completed in the Midwest and the temporal allocation for agricultural sources was also updated. A new nonroad estimation model was provided by U.S. EPA for the 2002 analysis.

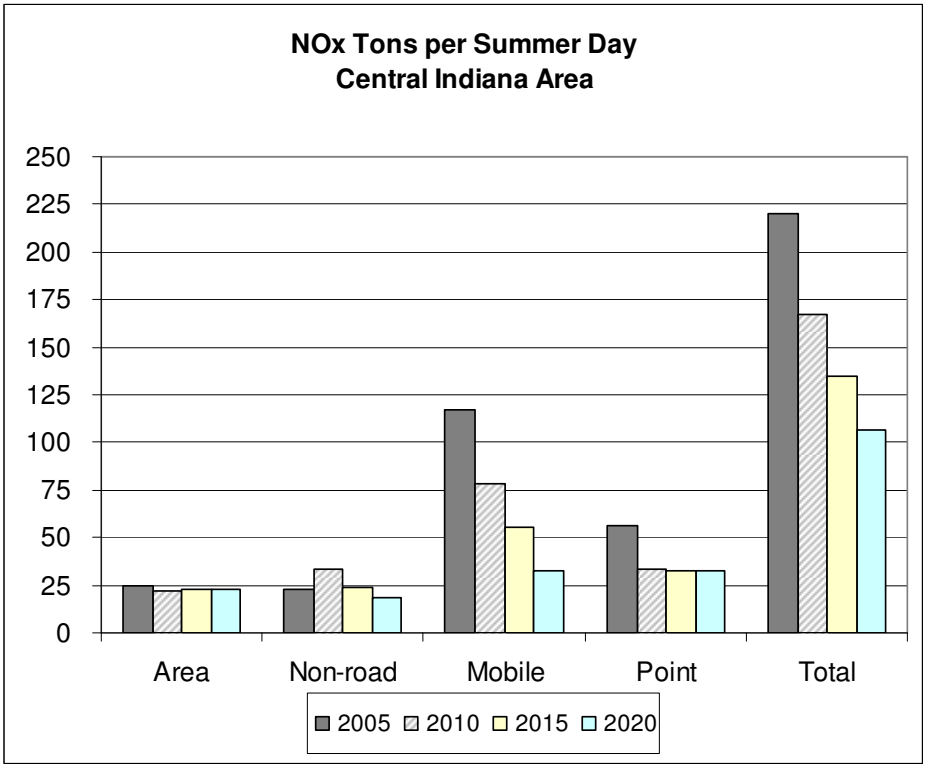
Appendix B contains data tables and graphs of all these emissions.

4.3 Emission Projections

In consultation with the U.S. EPA and other stakeholders, IDEM selected the year 2020 as the maintenance year for this redesignation request. This document contains projected emissions inventories for 2010, 2015 and 2020 for the Central Indiana Area. These emission projections were prepared by IDEM, with assistance from LADCO.

The detailed inventory information for the Central Indiana Area for 2010, 2015 and 2020 is in Appendix B. Emission trends are an important gauge for continued compliance with the ozone standard. Therefore, IDEM performed an initial comparison of the inventories for the base year (2005), interim years (2010 and 2015), and maintenance year (2020) for the Central Indiana Area. Graphs 4.6 and 4.7 visually compare the 2005 (base year) estimated emissions with the 2010, 2015 and 2020 projected emissions for the Central Indiana Area. Mobile source emission inventories are described in Section 5.0. In addition to LADCO's estimates, point source emissions were projected based upon the statewide EGU NO_x budgets from the Indiana NO_x rule.

Graph 4.6 Comparison of 2005 Estimated and 2010, 2015 and 2020 Projected NO_x Emissions for the Central Indiana Area



Graph 4.7 Comparison of 2005 Estimated and 2010, 2015 and 2020 Projected VOC Emissions for the Central Indiana Area

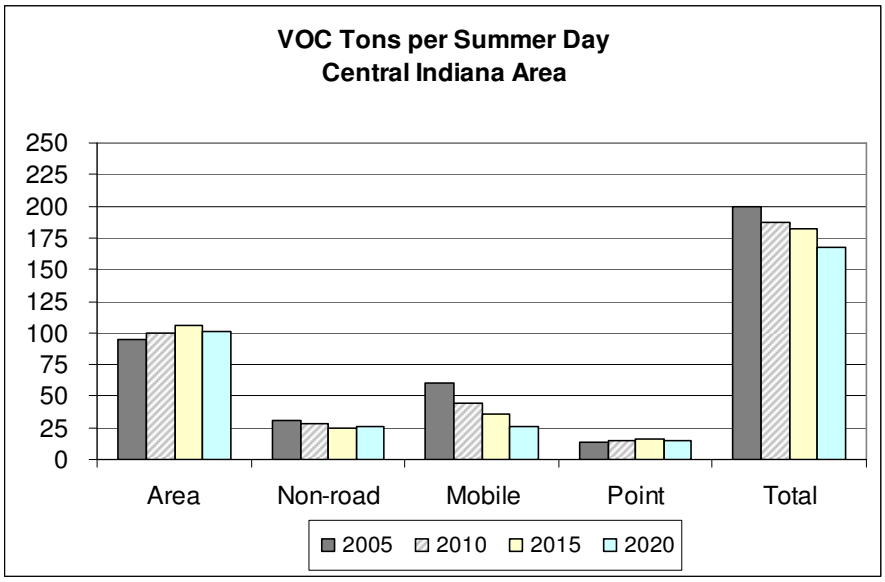


TABLE 4.1 Comparison of 2005 Estimated and 2020 Projected Emission Estimates in Tons Per Summer Day, Central Indiana Area

	2005	2020	Change	% Change
NOX	220.18	106.31	-113.87	-51.71
VOC	199.25	167.42	-31.83	-15.98

NO_x emissions within the Central Indiana Area are projected to decline by 51.71% between 2005 and 2020. Emission reduction benefits from U.S. EPA rules covering the NO_x SIP Call, Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements[3] Highway Heavy-Duty Engine Rule[4]and Non-Road Diesel Engine Rule[5]are factored into the changes. Further, due to implementation of the NOx SIP Call across the eastern United States, NOx and ozone levels entering this area will also be decreased. The Clean Air Interstate Rule (CAIR), issued in March 2005, adopted by the Indiana Air Pollution Control Board on November 1, 2006, and to be implemented by 2010, will reduce regional EGU NOx emissions state-wide by approximately another 17% in 2015. Since CAIR is a regional cap and trade program, it cannot be predicted at this time what effect this will have on EGU units located in the Central Indiana Area or other upwind counties. Therefore, potential reductions are not included in Graph 4.6 or Table 4.1. VOC emissions within the Central Indiana Area are projected to decline by 15.98% between 2005 and 2020.

3 http://www.epa.gov/fedrgstr/EPA-AIR/2000/February/Day-10/a19a.htm
4 http://www.epa.gov/fedrgstr/EPA-AIR/1997/October/Day-21/a27494.htm
5 http://www.epa.gov/fedrgstr/EPA-AIR/1998/October/Day-23/a24836.htm

4.4 Demonstration of Maintenance

Ambient air quality data from all the monitoring sites indicate that air quality in the Central Indiana Area met the NAAQS for ozone in 2006. U.S. EPA's Redesignation Guidance (Page 9) states, "A state may generally demonstrate maintenance of the NAAQS by either showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory, or by modeling to show that the future mix of sources and emissions rates will not cause a violation of the NAAQS**."** Emissions projections outlined in Section 4.0 of this document clearly illustrate that NO_x and VOC emissions will continue to decline between 2005 (base year) and 2020 (maintenance plan horizon). Section 7.0 further discusses the implications of these emissions trends and provides an analysis to support these conclusions. Therefore, air quality should meet the NAAQS ozone standard through the projected years of 2010, 2015 and 2020.

In Indiana, major point sources in all counties are required to submit air emissions information once every three (3) years or annually if the VOC potential to emit is greater than 250 tons or the NO_x potential to emit is greater than 2500 tons, in accordance with the Emission Statement Rule, 326 IAC 2-6. IDEM prepares a new periodic inventory for all ozone precursor emission sectors every three (3) years. These ozone precursor inventories will be prepared for 2007, 2010, and 2013 as necessary to comply with the inventory reporting requirements established in the CAAA. Emissions information will be compared to the 2005 base year and the 2020 projected maintenance year inventories to assess emission trends, as necessary, to assure continued compliance with the ozone standard.

4.5 Permanent and Enforceable Emissions Reductions

Permanent and enforceable reductions of volatile organic compounds and oxides of nitrogen have contributed to the attainment of the 8-hour ozone standard. Some of these reductions were due to the application of RACT rules and some were due to the application of tighter federal standards on new vehicles. Also, Title IV (Acid Rain) of the Clean Air Act and the NO_x SIP Call required the reduction of oxides of nitrogen from utility sources. Section 6.0 identifies the emission control measures specific to the Central Indiana Area, as well as the implementation status of each measure.

4.6 Provisions for Future Updates

As required by Section 175A(b) of the CAAA, Indiana commits to submit to the Administrator, eight (8) years after redesignation, an additional revision of this SIP. The revision will contain Indiana's plan for maintaining the national primary ozone air quality standard for ten (10) years beyond the first ten (10) year period after redesignation.

5.0 TRANSPORTATION CONFORMITY BUDGETS

5.1 On-Road Emission Estimations

The Indianapolis Department of Metropolitan Development (Greater Indianapolis), and the Madison County Council of Governments (Anderson Area) are the Metropolitan Planning Organizations (MPOs) for the nine county Central Indiana Area. The Metropolitan Planning Area (MPA) for the Columbus Area Metropolitan Planning Organization includes Blue River Township in Johnson County and Jackson Township in Shelby County. The remaining portions of Johnson and Shelby County are part of the MPA for the Indianapolis MPO. Modeling for these two township's are performed by the Indianapolis MPO and any changes to the CAMPO Transportation Plan that affects the aforementioned townships will have to be done in coordination with the Indianapolis MPO.

These organizations maintain a travel demand forecast model that is used to simulate the traffic in the area and is used to predict what the traffic would be like in future years given growth expectations. The model is used mostly to identify where travel capacity will be needed and to determine the infrastructure requirements necessary to meet that need. It is also used to support the calculation of mobile source emissions. The travel demand forecast model is used to predict the total daily Vehicle Miles Traveled (VMT) and an EPA software program called MOBILE6 is used to calculate the emissions per mile. The product of these two outputs, once combined, is the total amount of pollution emitted by the on-road vehicles for the particular analyzed area.

5.2 Overview

Broadly described, MOBILE6 is used to determine "emission factors", which are the average emissions per mile (grams/mile) for ozone precursors: NOx and VOC. There are numerous variables that can affect the emission factors. The vehicle-fleet (vehicles on the road) age and the vehicle types have a major effect on the emission factors. The facility-type the vehicles are traveling on (MOBILE6 facility-types are Freeway, Arterial, Local and Ramp) and the vehicle speeds also affect the emission factor values. Meteorological factors such as air temperature and humidity affect the emission factors and any Vehicle Inspection/Maintenance program in the area will also affect emissions. These data are estimated using the *best available data* (see section 5.3) to create emission factors for the appropriate ozone precursors, NOx and VOC. After emission factors are determined, the emission factor(s) must be multiplied by the VMT to determine the quantity of vehicle-related emissions. This information derives from the travel demand model.

It should be noted that each year analyzed will have different emission factors, volumes, speeds and likely some additional links. MOBILE6 input and output files can all be found in Appendix E.

5.3 Analysis Years

The travel demand model contains road networks that are time specific. The Central Indiana MPOs have modeled the years 2002, 2006, 2010, 2020, and 2030. Information, including emissions, has also been interpolated from 2002 and 2006 for the year 2005, and from 2010 and 2020 for the year 2015. This Redesignation Petition provides emission inventory estimates for 2002, 2005, 2006, 2010, 2015 and 2020 to meet the requirements specified by the Clean Air Act and the U.S. EPA. The emissions estimates outlined in Section 4 of this document reference the 2005, 2010, 2015 and 2020 mobile source emissions data referenced below in Table 5.1.

5.4 Emission Estimations

Table 5.1 contains the results of the emissions estimates by county for the years 2002, 2005, 2006, 2010, 2015, 2020, and 2030.

Table 5.1 - Emission Estimates in Tons Per Summer Day for On-Road Mobile Sources- Central Indiana Area

NOx

	2002	2005*	2006	2010	2015**	2020	2030
Boone	7.04	5.52	5.01	3.76	2.66	1.56	1.23
Hamilton	16.11	12.71	11.58	9.04	6.49	3.94	3.17
Hancock	7.26	5.66	5.13	3.92	2.79	1.66	1.37
Hendricks	9.03	7.02	6.35	5.04	3.54	2.03	1.64
Johnson	10.29	8.02	7.26	5.54	3.93	2.31	1.86
Madison	10.92	8.48	7.66	5.77	4.08	2.40	1.68
Marion	75.11	59.35	54.10	38.61	27.20	15.79	12.15
Morgan	6.48	4.97	4.47	3.48	2.45	1.42	1.11
Shelby	6.14	5.01	4.63	3.24	2.29	1.34	1.06
Total	148.38	116.74	106.19	78.40	55.42	32.45	25.27

VOC

	2002	2005*	2006	2010	2015**	2020	2030
Boone	3.31	2.55	2.29	1.94	1.55	1.16	1.21
Hamilton	9.38	7.22	6.50	5.49	4.42	3.34	3.54
Hancock	3.61	2.76	2.48	2.12	1.71	1.30	1.45
Hendricks	4.52	3.43	3.07	2.68	2.15	1.61	1.69
Johnson	5.28	4.03	3.61	3.09	2.49	1.88	1.99
Madison	6.19	4.54	3.99	3.43	2.72	2.01	1.84
Marion	40.68	31.33	28.21	22.05	17.58	13.10	12.96
Morgan	3.38	2.47	2.17	1.86	1.47	1.08	1.10
Shelby	2.71	2.18	2.00	1.53	1.26	0.99	1.06
Total	79.06	60.50	54.32	44.19	35.33	26.47	26.84

*2005 emissions were interpolated from 2002 and 2006 estimates.
**2015 emissions were interpolated from 2010 and 2020 estimates.

5.5 Motor Vehicle Emission Budget-Regional

Table 5.2 contains the motor vehicle emissions budgets in tons per summer day for the Central Indiana Area for the years 2006 and 2020.

Table 5.2 – Mobile Vehicle Emission Budgets in Tons Per Summer Day-Central Indiana Area

	2006	2020
VOC	54.32	29.52
NOx	106.19	35.69

These budgets include the emissions estimates calculated for 2006 and 2020. A reasonable margin of safety has been applied to the budgets for the year 2020. The emission estimates are derived from the MPOs travel demand models and MOBILE6 as described above. Margins of safety are used to accommodate the wide array of assumptions that are factored into the calculation process. Since assumptions change over time, it is necessary to have a margin of safety that will accommodate the impact of refined assumptions in the process. With the margins of safety applied to the 2020 budgets, the 2020 total VOC and NO_x emissions remain well below the base year emissions referenced in Table 4.1.

The interagency consultation partners chose to include budgets for the year 2006 to assist in streamlining the transportation conformity process. These 2006 budgets shall supersede the 2006 1-hour maintenance plan budgets for Marion County. The year 2006 was chosen because it represents the year the area attained the 8-hour ozone standard and the travel demand models contain a network for 2006, but not 2005. The nine county 8-hour ozone maintenance area is much broader than the single county 1-hour maintenance area that included Marion County only. However, in comparing the 2006 1-hour maintenance plan emissions budgets for Marion County to the 2006 emissions estimates for Marion County referenced in Table 5.1, the budgets contained herein for 2006 can be deemed more stringent. This is illustrated in Table 5.3 below:

Table 5.3 – 2006 Mobile Vehicle Emissions Comparison in Tons Per Summer Day-Marion County

Marion County	VOC	NOx
2006-1 hour budget	71.7	63.10
2006-8 hour budget	28.21	54.10

All methodologies, latest planning assumptions and margins of safety were determined appropriate through the interagency consultation process.

6.0 CONTROL MEASURES AND REGULATIONS

This section provides specific information on the control measures implemented in the Central Indiana Area, including CAAA requirements and additional state or local measures implemented beyond CAAA requirements.

6.1 Reasonably Available Control Technology (RACT)

As required by Section 172 of the CAAA, Indiana in the mid-1990s promulgated rules requiring RACT for emissions of VOCs. There were no specific rules required by the CAAA such as RACT for existing sources beyond statewide rules for the Central Indiana Area as defined in Sections 1.1 and 1.2. Statewide RACT rules have applied to all new sources locating in Indiana since that time. The Indiana rules are found in 326 IAC 8. The following is a listing of applicable rules:

326 IAC 8-1-6 BACT for non-specific sources
326 IAC 8-2 Surface Coating Emission Limitations
326 IAC 8-3 Organic Solvent Degreasing Operations
326 IAC 8-4 Petroleum Sources
326 IAC 8-5 Miscellaneous Operation
326 IAC 8-6 Organic Solvent Emission Limitations

326 IAC 8-8.1-1 Municipal Solid Waste Landfills Not Located in Clark, Floyd, Lake, and Porter Counties

As a result of its designation under the one-hour ozone standard, sources that existed after July 1, 1990 in Marion County are also subject to the RACT rules above. In addition, a select group of collar counties are subject to portions of 326 IAC 8-4 (8-4-4 through 8-4-7 and 8-4-9) that do not apply statewide, including Boone, Hancock, Hamilton, Johnson, Morgan, and Shelby Counties. Please note that all sections of 326 IAC 8-4 apply to Hendricks and Marion Counties with the exception of 326 IAC 8-4-6(e).

6.2 Implementation of Past SIP Revisions

This nonattainment area was not required to develop an Attainment Demonstration SIP for the one-hour ozone NAAQS. Similarly, since the area was only recently designated nonattainment for ozone and the area has now attained the standard, no Attainment Demonstration SIP is required to bring the area into attainment for the 8-hour ozone NAAQS. Therefore, this requirement does not apply.

6.3 Nitrogen Oxides (NO_x) Rule

The U.S. EPA NO_x SIP Call required twenty-two (22) states to adopt rules that would result in significant emission reductions from large EGUs, industrial boilers, and cement kilns in the eastern United States. Indiana adopted this rule in 2001. Beginning in 2004, this rule accounts for a reduction of approximately thirty-one percent (31%) of all NO_x emissions statewide compared to previous uncontrolled years.

Twenty-one other states have also adopted these rules. The result is that significant reductions have occurred upwind and within the Central Indiana Area nonattainment area because of the number of affected units within the region. From Graphs 4.3 and 4.4 it can be seen that emissions covered by this program have been trending downward since 1999. Table 6.1, compiled from data taken from the U.S. EPA Clean Air Markets website, quantifies the gradual NO_x reductions that have occurred in Indiana as a result of Title IV (Acid Rain) of the Clean Air Act Amendments and the beginning of the NO_x SIP Call Rule. This cap will stay in place through 2008, at which time the caps in the CAIR program will supersede it.

Further, U.S. EPA has recently published Phase II of the NO_x SIP Call that establishes a budget for large (greater than 1 ton per day emissions) stationary internal combustion engines. This rule will decrease emissions statewide from natural gas compressor stations by 4,263 tons during the ozone season. This rule became effective February 26, 2006. Implementation of this rule will be in 2007.

TABLE 6.1 Trends in EGU Ozone Season NO_x Emissions Statewide in Indiana

Year	NO_x Emissions, tons / ozone season
1997	152,834
1998	159,931
1999	149,827
2000	133,881
2001	136,121
2002	114,082
2003	99,967
Cap 2004-2009	43,654

6.4 Measures Beyond Clean Air Act SIP Requirements

Reductions in ozone precursor emissions have occurred, or are anticipated to occur, as a result of local and federal control programs. These additional control measures include:

Tier II Emission Standards for Vehicles and Gasoline Sulfur Standards

In February 2000, U.S. EPA finalized a federal rule to significantly reduce emissions from cars and light trucks, including sport utility vehicles (SUVs). Under this regulation, automakers will be required to sell cleaner cars, and refineries will be required to make cleaner, lower sulfur gasoline. This rule applies nationwide. The federal rules will be phased in between 2004 and 2009. U.S. EPA has estimated that NO_x emission reductions will be approximately seventy-seven percent (77%) for passenger cars, eighty-six percent (86%) for smaller SUVs, light trucks, and minivans, and sixty-five to ninety-five percent (65-95%) reductions for larger SUVs, vans, and heavier trucks. VOC emission reductions will be approximately twelve percent (12%) for passenger cars, eighteen percent (18%) for smaller SUVs, light trucks, and minivans, and fifteen percent (15%) for larger SUVs, vans, and heavier trucks.

Heavy-Duty Diesel Engines

In July 2000, U.S. EPA issued a final rule for Highway Heavy Duty Engines, a program that includes low-sulfur diesel fuel standards, which will be phased in from 2004 through 2007. This rule applies to heavy-duty gasoline and diesel trucks and buses. This rule will result in approximately a forty percent (40%) reduction in NO_x from diesel trucks and buses, a large sector of the mobile sources NO_x inventory.

Clean Air Nonroad Diesel Rule

In May 2004, U.S. EPA issued the Clean Air Nonroad Diesel Rule. This rule applies to diesel engines used in industries such as construction, agriculture, and mining. It also contains a cleaner fuel standard, similar to the highway diesel program. The new standards will cut emissions from nonroad diesel engines by over ninety percent (90%). Nonroad diesel equipment, as described in this rule, currently accounts for forty-seven

(47%) percent of diesel particulate matter (PM) and twenty-five percent (25%) of nitrogen oxides (NO_x) from mobile sources nationwide. Sulfur levels will be reduced in nonroad diesel fuel by ninety-nine percent (99%) from current levels, from approximately three-thousand (3,000) parts per million (ppm) now to (fifteen) 15 ppm in 2010. New engine standards take effect, based on engine horsepower, starting in 2008.

VOC Control Rules-MRPO States

IDEM is proposing to implement statewide VOC control rules that have been agreed to by the MRPO states (Illinois, Indiana, Michigan, Ohio, and Wisconsin) to address regional ozone and particulate matter nonattainment areas in the upper Midwest. The rules will apply region-wide to automobile refinishing, architectural and industrial maintenance (AIM) coatings, consumer products, degreasing, portable fuel containers and Stage I vapor recovery.

Together, these rules will substantially reduce local and regional sources of ozone precursors. The modeling analyses discussed in Section 7.0 include these rules and show the ozone concentrations expected to result from the implementation of these rules.

6.5 Controls to Remain in Effect

Indiana commits to maintain the control measures listed above after redesignation, or submit to U.S. EPA as a SIP revision any changes to its rules or emission limits applicable to VOC or NO_x sources as required for maintenance of the ozone standard in the Central Indiana Area.

Indiana, through IDEM's Office of Air Quality and its Office of Enforcement, has the legal authority and necessary resources to actively enforce any violations of its rules or permit provisions. After redesignation, it intends to continue enforcing all rules that relate to the emission of ozone precursors in the Central Indiana Area.

6.6 New Source Review Provisions

Indiana has a long standing and fully implemented New Source Review (NSR) program that is outlined in rule 326 IAC 2. The rule includes provisions for the Prevention of Significant Deterioration (PSD) permitting program in 326 IAC 2-2. Indiana's PSD program was conditionally approved on March 3, 2003 (68 FR 9892) and received final approval on May 20, 2004 (69 FR 29071) by U.S. EPA as part of the SIP.

Any facility that is not listed in the 2002 emission inventory, or for the closing of which credit was taken in demonstrating attainment, will not be allowed to construct, reopen, modify, or reconstruct without meeting all applicable permit rule requirements. The review process will be identical to that used for new sources. Once the area is redesignated, OAQ will implement NSR through the PSD program, which requires an air quality analysis to evaluate whether the new source will threaten the NAAQS.

6.7 Local Air Quality Mitigation

The City of Indianapolis Office of Environmental Services (OES) has worked with the community to identify and implement a number of locally enforceable control measures via ordinance and regulation in addition to ozone awareness and voluntary reduction activities.

Regulatory Measures

Chapter 511 "Air Pollution Control" of the Consolidated City of Indianapolis and Marion County is the ordinance that creates the regulatory framework for the Office of Environmental Services including the permitting, compliance, and enforcement activities. The ordinance also creates the authority for the Indianapolis Air Pollution Control Board to promulgate regulations. Many of the City's regulations are established through adoption and incorporation by reference of the State of Indiana regulations; however, several of the City's ordinance sections and regulations were created specifically to ensure the City's protection of the air quality.

The ordinance and regulations address the following subjects:

Ordinance or Regulation	Subject
Chapter 511, Sections 511-701 through 511-709	Open Burning Prohibitions
Regulation 4, Section 3	Outdoor Wood-fired Heating Devices (new installation banned)
Regulation 5, Section 2	Vehicle or Engine Operations (prohibits visible emissions from vehicles)

Voluntary Measures

Knozone Program

Beginning in 1995, the City began the Knozone Program to educate citizens about ground level ozone and measures to be taken when ozone levels are high. The Knozone Program website is www.knozone.com. The City participates in many community events and promotes ozone reduction at every opportunity. The Knozone Program has developed teacher kits for 3rd grade students and comic books for elementary school children, sponsored bike give-aways, met with local television and radio media to promote ozone awareness, advertised the program on billboards and radio, and provided information to citizens.

The program continues to expand its message into other Central Indiana counties in addition to promoting awareness of the health effects of fine particulates and ozone in Central Indiana.

The City monitors the air quality and declares "Knozone Air Quality Action Days" when the air quality index is forecasted to be "Unhealthy for Sensitive" groups or higher.

To date, the City has obtained grant funds in excess of $1,000,000 to promote ozone awareness in Central Indiana.

Diesel Oxidation Catalyst Program

In 2005, the City obtained grant funding to modify existing municipal diesel vehicles and equipment by replacing the mufflers with diesel oxidation catalysts (DOC). The DOC program has resulted in 84 municipal vehicle retrofits in Marion County so far.

Additionally in 2005, the City obtained grant funding and retrofitted 175 Indianapolis Public School diesel school buses with DOCs.

As the result of a local company's settlement with the United States Environmental Protection Agency, the City obtained $145,000 to retrofit municipal vehicles outside Marion County in the eight (8) other non-attainment counties in Central Indiana.

Idle Reduction Program

In 2006, the City implemented an idle reduction policy for all municipal vehicles including the police and fire departments. The City's policy emphasizes the importance of not idling unnecessarily to reduce air pollution and provide fuel savings.

A local environmental group, Improving Kids' Environment, has obtained a grant to educate and implement idle reduction programs, with the City's assistance, at elementary schools in Marion County.

Although several of these local air quality mitigation efforts are not deemed permanent and enforceable under state or federal authority, they are a valuable asset to the community and will continue to further supplement air quality improvements in the region.

7.0 MODELING AND METEOROLOGY

Although U.S. EPA's redesignation guidance does not require modeling for ozone nonattainment areas seeking redesignation, extensive modeling has been performed covering the Central Indiana region to determine the effect of national emission control strategies on ozone levels. These modeling analyses determined that Marion, Boone, Hamilton, Hancock, Hendricks, Johnson, Madison, Morgan and Shelby Counties are significantly impacted by ozone and ozone precursor transport, and regional NO_x reductions are an effective way to attain the 8-hour standard in this area. Future year modeled ozone concentrations are expected to be reduced by 10% to 20% from baseline design values. Examples of these modeling analyses are listed below.

7.1 Summary of Modeling Results for National Emission Control Strategies in Final Rulemakings

U.S. EPA Modeling Analysis for HDE Final Rulemaking

U.S. EPA conducted modeling for Tier II vehicles and low-sulfur fuels. This analysis was performed in 2000 to support final rulemaking for the Heavy Duty Engine (HDE) and Vehicle Standards and Highway Diesel Fuel and its expected impact on ozone levels. "Technical Support Document for the Heavy Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements: Air Quality Modeling Analyses" (EPA420-R-00-028) was referenced for support of this ozone redesignation for the Central Indiana counties. Base year emissions from

1996 were modeled for three ozone episodes: June 12-24, 1995; July 5-15, 1995; and August 7-21, 1995. Results of this modeling show that these fuel and engine emission control measures and the NO_x SIP Call would reduce ozone in the Central Indiana counties. Relative Reduction Factors (RRF) were calculated for each monitor in Marion, Hamilton, Hancock, Johnson, Madison and Morgan Counties (ozone monitors in Boone, Hendricks and Shelby Counties were not in operation at the time modeling was conducted) for future years 2007 and 2020. These RRFs were applied to the three-year (2001-2003) design values at the ozone monitors in the Central Indiana counties. The resulting future year design values for 2007 and 2020 were calculated and are shown below in Table 7.1. The modeled 2007 future year design values for all monitors in Central Indiana were reduced by 11% to 21% of the 2001-2003 design values and the modeled 2020 future year design values were reduced by 10% to 20% of the 2001-2003 design values. All ozone monitors are projected to attain the 8-hour ozone NAAQS of 0.085 ppm in 2007 as a result of the Tier II vehicles and low-sulfur fuels rule. It should be noted that the modeling was conducted using 1996 emissions and additional federal emission control measures have been implemented which will lower modeled concentrations.

Table 7.1 - Modeling Results for Central Indiana from U.S. EPA HDE Rulemaking

Monitor ID	Monitor Name	County	Design Value 2001-2003	Modeled Relative Reduction Factor (RRFs)	Future Design Value 2007	Modeled Relative Reduction Factor (RRFs)	Future Design Value 2020
			(ppm)	2007 Control	(ppm)	2020 Control	(ppm)
180970042	Mann Rd.	Marion	0.0817	0.8411	0.0687	0.8501	0.0694
180970050	Fort Harrison	Marion	0.0927	0.8603	0.0797	0.8716	0.0808
180970057	Harding St.	Marion	0.0850	0.8873	0.0754	0.8992	0.0764
180970073	NAC	Marion	0.0897	0.8603	0.0771	0.8716	0.0782
180571001	Noblesville	Hamilton	0.0967	0.8332	0.0805	0.8428	0.0815
180590003	Fortville	Hancock	0.0940	0.8342	0.0784	0.8436	0.0793
180810002	Trafalgar	Johnson	0.0860	0.7932	0.0682	0.7997	0.0688
180950010	Emporia	Madison	0.0950	0.8144	0.0774	0.8229	0.0782
181090005	Monrovia	Morgan	0.0857	0.8181	0.0701	0.8260	0.0708

7.2 Summary of Modeling Results to Support Rulemakings

U.S. EPA Modeling for Clean Air Interstate Rule (CAIR), 2005

On March 10, 2005, the U.S. EPA finalized the Clean Air Interstate Rule (CAIR). NO_x emissions from power plants will be cut by 1.7 million tons by 2009 and emissions will be reduced by 1.3 million tons in 2015 in 28 eastern states and the District of Columbia. As a result of implementation of CAIR, Indiana will reduce NOx emissions by 113 thousand tons from 2009 emissions projections without CAIR and 149 thousand tons from 2015 emissions projections without CAIR.

U.S. EPA performed modeling to support the associated emission reductions. The modeling was based on 1999 through 2003 design values. Future year modeling was conducted, including all Central Indiana Counties, and the future year design values for 2010 and 2015 were evaluated for attainment of the 8-hour ozone NAAQS, as shown below in Table 7.2. Results of the CAIR modeling show that all Central Indiana counties will attain the 8-hour ozone NAAQS in 2010 with modeled concentrations reduced by 12 % to 15%, and remain below 0.085 ppm. With further reductions projected in CAIR for 2015, all design values continue to decrease by 15% to 20% and continue to attain the 8-hour ozone NAAQS.

Table 7.2 Modeling Results from U.S. EPA for the Clean Air Interstate Rule

County	MSA/CMSA	Design Value 1999-2003	Future Design Value 2010 with CAIR	Future Design Value 2015 with CAIR
		(ppm)	(ppm)	(ppm)
Marion	Indianapolis	0.0900	0.0796	0.0746
Boone	Indianapolis	0.0890	0.0781	0.0730
Hamilton	Indianapolis	0.0933	0.0817	0.0762
Hancock	Indianapolis	0.0917	0.0804	0.075
Hendricks	Indianapolis	0.0865	0.0759	0.0709
Johnson	Indianapolis	0.0867	0.0738	0.0688
Madison	Indianapolis	0.0910	0.0786	0.0729
Morgan	Indianapolis	0.0867	0.0757	0.0706
Shelby	Indianapolis	0.0935	0.0816	0.0762

LADCO modeling for Clean Air Interstate Rule (CAIR)

LADCO conducted modeling to determine the impact of CAIR in the Midwest. The modeling was based on 2000 through 2004 design values. Future year modeling for 2009, 2012, and 2018 was conducted and the future year design values were determined, as shown below in Table 7.3.

Table 7.3 LADCO's Round 4 Modeling Results for the Clean Air Interstate Rule

Monitor ID	Monitor Name	County	Design Value 2000-2004	Basecase with CAIR - 2009	Basecase with CAIR - 2012	Basecase with CAIR – 2018
			(ppm)	(ppm)	(ppm)	(ppm)
180970042	Mann Rd.	Marion	0.0807	0.0740	0.0732	0.0684
180970050	Fort Harrison	Marion	0.0900	0.0837	0.0824	0.0768
180970057	Harding St.	Marion	0.0837	0.0774	0.0763	0.0712
180970073	NAC	Marion	0.0880	0.0808	0.0795	0.0741
180110001	Whitestown	Boone	0.0879	0.0799	0.0782	0.0726
180571001	Noblesville	Hamilton	0.0904	0.0837	0.0820	0.0759
180590003	Fortville	Hancock	0.0896	0.0838	0.0821	0.0760
180630004	Avon	Hendricks	0.0847	0.0766	0.0751	0.0698
180810002	Trafalgar	Johnson	0.0847	0.0766	0.0751	0.0698
180950010	Emporia	Madison	0.0917	0.0816	0.0795	0.0731
181090005	Monrovia	Morgan	0.0850	0.0756	0.0740	0.0687
181450001	Fairland	Shelby	0.0913	0.0829	0.0810	0.0753

Results of the CAIR modeling show that all Central Indiana Counties will attain the 8-hour ozone NAAQS of 0.085 ppm by 2009. Future year modeled ozone concentrations for 2009 will be 6% to 11% lower than baseline ozone design values, 8% to 13% lower in 2012 and 15% to 20% lower in 2018. Ozone concentrations are predicted to continue to decrease and remain in attainment of the 8-hour ozone NAAQS of 0.085 ppm.

7.3 Summary of Existing Modeling Results

U.S. EPA and LADCO modeling for future year design values have consistently shown that existing national emission control measures will bring the Central Indiana Counties into attainment of the 8-hour ozone NAAQS. Emission control measures to be implemented in the next several years will provide even greater assurance that air quality will continue to meet the standard into the future. Modeling support for the NO_x SIP Call, Heavy Duty Engine and Highway Diesel Fuel and Tier II/Low Sulfur Fuel and Clean Air Interstate Rule has shown that future year design values for the Central Indiana Counties will attain the ozone standard with modeled future year design values below 0.085 ppm. U.S. EPA future year modeling of national emission control strategies showed the Central Indiana Counties will attain the 8-hour ozone NAAQS without additional national emission controls. Future national and local emission control strategies will ensure that each Central Indiana County's attainment will be maintained with an increasing margin of safety over time.

7.4 Temperature Analysis for Central Indiana

Meteorological conditions are one of the most important factors that influence ozone development and transport. A temperature analysis has been conducted to determine how the temperatures during the ozone conducive months of May, June, July, August and September compare to normal temperatures for Central Indiana. Temperature information was taken from the National Weather Service (NWS) Station at Indianapolis International Airport in Indianapolis, Indiana. Available normal maximum temperatures by summer months from 1971 through 2000 for the Central Indiana area are as follows:

May – 73.5^{o} F
June – 82.1^{o} F
July – 85.6^{o} F
August – 83.7^{o} F
September – 77.4^{o} F
May - September – 80.5^{o} F

Central Indiana's monthly maximum temperatures for the previous nine years (1998 through 2006) during the summer months of May, June, July, August, and September are compared to normal summer month temperatures in Table 7.4. Overall, the temperatures during the 1998, 1999, 2002 and 2005 summer months were 1% to 2% above normal while temperatures during the 2000, 2001, 2003, 2004 and 2006 summer months were normal to 1% - 3% lower than the normal temperatures. Table 7.4 shows the average maximum temperatures and the percent difference from normal for each year.

Table 7.4 Analysis of Maximum Temperatures for Central Indiana Counties

(Percent Change from Maximum Temperature (°F) Normals (1971 – 2000))

	Normal	1998		1999		2000		2001		2002	
	Max	Max	%	Max	%	Max	%	Max	%	Max	%
May	73.5	76.4	+4	75.1	+2	74.9	+2	74.6	+1	70.4	-4
June	82.1	80.3	-2	82.3	0	80.2	-2	79.5	-3	83.6	+2
July	85.6	84.0	-2	89.2	+4	82.4	-4	83.9	-2	88.2	+3
August	83.7	84.5	+1	83.3	0	82.6	-1	85.2	+2	86.7	+4
September	77.4	83.0	+7	81.2	+5	75.5	-2	75.4	-3	82.1	+6
AVE. May-Sept.	**80.5**	**81.6**	**+1**	**82.2**	**+2**	**79.1**	**-2**	**79.7**	**-1**	**82.2**	**+2**

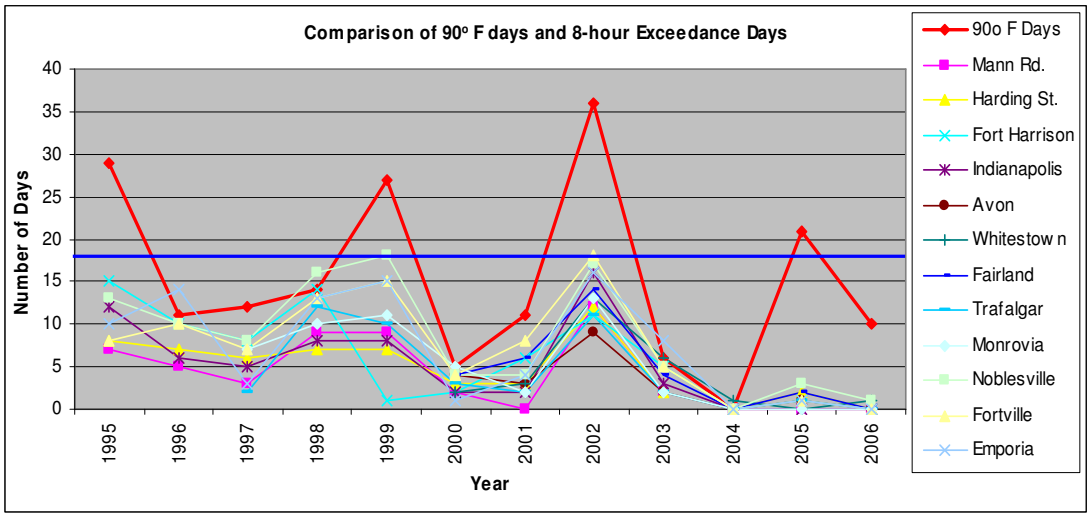
	Normal	2003		2004		2005		2006	
	Max	Max	%	Max	%	Max	%	Max	%
May	73.5	70.3	-4	76.2	+4	71.2	-3	70.7	-4
June	82.1	78.0	-5	80.7	-2	84.3	+3	80.1	-2
July	85.6	83.4	-3	81.6	-5	85.9	0	85.3	0
August	83.7	83.9	0	78.9	-6	85.5	+2	83.4	0
September	77.4	74.2	-4	79.4	+3	80.4	+4	72.9	-6
AVE. May-Sept.	**80.5**	**78.0**	**-3**	**79.4**	**-1**	**81.5**	**+1**	**78.5**	**-2**

The number of days with temperatures of 90° F and higher was collected from the NWS Station at the Indianapolis International Airport from 1971 through 2000. The average number of 90° F and higher days for the Central Indiana area is 17.6. Table 7.5 shows a comparison of 8-hour ozone exceedances and temperatures at 90° F and higher while Graph 7.1 shows the correlation graphically.

Table 7.5 - Comparison of Days with 90° F and 8-Hour Ozone Exceedance Days

Number of Days with Temperatures of 90° F and higher													
	Normal	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
# of 90° F days	**17.6**	29	11	12	14	27	5	11	36	6	0	21	10
Number of 8-Hour Exceedance Days at the Central Indiana area ozone monitors													
Monitor	**County**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Mann Rd.	Marion	7	5	3	9	9	2	0	12	2	0	0	0
Fort Harrison	Marion	15	10	8	14	1	2	6	11	5	0	1	0
Harding St.	Marion	8	7	6	7	7	3	3	12	2	0	2	0
NAC	Marion	12	6	5	8	8	2	2	16	3	0	0	0
Whitestown	Boone						2	3	13	6	1	0	1
Noblesville	Hamilton	13	10	8	16	18	4	4	17	5	0	3	1
Fortville	Hancock	8	10	7	13	15	4	8	18	5	0	1	0
Avon	Hendricks						4	3	9	2	0	1	0
Trafalgar	Johnson			2	12	10	3	2	11	2	0	1	0
Emporia	Madison	10	14	3	13	15	1	4	16	8	0	1	0
Monrovia	Morgan			7	10	11	5	2	13	2	0	0	0
Fairland	Shelby						4	6	14	4	0	2	0

Graph 7.1 - Comparison of Days with 90° F and 8-Hour Ozone Exceedance Days



As can be seen, a greater number of ozone exceedance days per year correlate with a greater number of 90° F days per year. The effects of national control measures, such as the NOx SIP Call in 2004 appear to have had an impact on the number of ozone exceedance days per year. This is evident because 2005 had a higher than average number of days with temperatures of 90° F or more but the number of 8-hour exceedance days was low. While other meteorological factors may have influenced this to some degree, it appears that the lower emissions helped to keep 8-hour exceedance days lower during the ozone-conducive conditions of 2005. The overall trend of lower ozone concentrations in Central Indiana over the past several years is shown in the Graph 7.1 above.

7.5 Summary of Meteorological Conditions

The analysis of the departure from normal of the maximum temperatures during the summer months shows variation in the number of 90° F days per year as illustrated in Table 7.5. The analysis shows that 20 or more days with temperatures of 90° F and higher occurred in 1995, 1999, 2002 and 2005. The number of 8-hour ozone exceedance days for those years shows a greater correlation to the number of higher temperature days. However, the years with a lesser number of 90° F days still yielded 8-hour ozone exceedance days. This is why U.S. EPA developed the 8-hour standard as a 4th high ozone value averaged over 3 years to account for variations in temperature. However, national emission control strategies implemented over the past several years have helped to lower ozone values in the Central Indiana area. Lower ozone values correspond to lowered local and regional ozone precursor emissions. Despite summer temperature variations over the previous twelve years, ozone values in all the Central Indiana counties have decreased fairly consistently since 1995.

8.0 CORRECTIVE ACTIONS

8.1 Commitment to Revise Plan

As noted in Section 4.6 above, Indiana hereby commits to review its Maintenance Plan eight (8) years after redesignation, as required by Section 175A of the CAAA.

8.2 Commitment for Contingency Measures

Indiana hereby commits to adopt and expeditiously implement necessary corrective actions in the following circumstances:

Warning Level Response:
A Warning Level Response shall be prompted whenever an annual (1-year) fourth high monitored value of 0.089 ppm occurs in a single ozone season, or a two (2)-year average fourth high monitored value of 0.085 parts per million (ppm) or greater occurs within the maintenance area. A Warning Level Response will consist of a study to determine whether the ozone value indicates a trend toward higher ozone values or whether emissions appear to be increasing. The study will evaluate whether the trend, if any, is likely to continue and, if so, the control measures necessary to reverse the trend taking into consideration ease and timing for implementation, as well as economic and social considerations. Implementation of necessary controls in response to a Warning Level Response trigger will take place as expeditiously as possible, but in no event later than twelve (12) months from the conclusion of the most recent ozone season (September 30).

Should it be determined through the Warning Level study that action is necessary to reverse the noted trend, the procedures for control selection and implementation outlined under "Action Level Response" shall be followed.

Action Level Response

An Action Level Response shall be prompted whenever a violation of the standard (three (3)-year average fourth high value of 0.085 ppm or greater) occurs. In the event that the Action Level is triggered and is not found to be due to an exceptional event, malfunction, or noncompliance with a permit condition or rule requirement, IDEM will determine additional control measures needed to assure future attainment of NAAQS for ozone. In this case, measures that can be implemented in a short time will be selected in order to be in place within eighteen (18) months from the close of the ozone season that prompted the Action Level.

Control Measure Selection and Implementation

Adoption of any additional control measures is subject to the necessary administrative and legal process. This process will include publication of notices, an opportunity for public hearing, and other measures required by Indiana law for rulemaking by state environmental boards.

If a new measure or control is already promulgated and scheduled to be implemented at the federal or state level, and that measure or control is determined to be sufficient to address the upward trend in air quality, additional local measures may be unnecessary. Furthermore, Indiana will submit to U.S. EPA an analysis to demonstrate the proposed measures are adequate to return the area to attainment.

8.3 Contingency Measures

Contingency measures to be considered will be selected from a comprehensive list of measures deemed appropriate and effective at the time the selection is made. Listed below are example measures that may be considered, if necessary. This listing of example measures derives in part through the collaborative efforts of the Central Indiana Air Quality Advisory Group (CIAQAG). This group was composed of local government representatives of all nine Central Indiana nonattainment counties as well as environmental groups, industry representatives, and other stakeholders. The CIAQAG spent two years carefully evaluating VOC and NO_x emission control measures and reached a consensus on a list of prioritized measures for IDEM to consider for SIP development purposes in April 2006. IDEM is proceeding with rulemaking action to support the implementation of several of the CIAQAG's recommended measures, including greater geographic applicability of Stage I vapor recovery requirements, emission standards for portable fuel containers, degreasing, and automobile refinishing.

The selection of measures for implementation will be based upon cost-effectiveness, emission reduction potential, economic and social considerations or other factors that IDEM deems appropriate. IDEM will solicit input from all interested and affected persons in the maintenance area, including the CIAQAG, prior to selecting appropriate contingency measures. All of the listed contingency measures are potentially effective or proven methods of obtaining significant reductions of ozone precursor emissions. Because it is not possible at this time to determine what control measure will be appropriate at an unspecified time in the future, the list of contingency measures outlined below is not comprehensive. Indiana anticipates that if contingency measures should ever be necessary, it is unlikely that a significant number (i.e., all those listed below) will be required.

1) Lower-Reid vapor pressure gasoline program.
2) Broader geographic applicability of existing measures.
3) Tighten RACT on existing sources covered by U.S. EPA Control Technique Guidelines issued in response to the 1990 CAAA.
4) Apply RACT to smaller existing sources.
5) A modern vehicle inspection/maintenance program.
6) One or more transportation control measures sufficient to achieve at least a half a percent (0.5%) reduction in actual area wide VOC emissions. Transportation measures will be selected from the following based upon the factors listed above after consultation with affected local governments:
    a) Trip reduction programs, including, but not limited to, employer-based transportation management plans, area wide rideshare programs, work schedule changes, and telecommuting.

b) Transit improvements.
c) Traffic flow improvements.
d) Other new or innovative transportation measures not yet in widespread use that affects state and local governments.

7) Alternative fuel and diesel retrofit programs for fleet vehicle operations.
8) Require VOC or NO_x emission offsets for new and modified major sources.
9) Require VOC or NO_x emission offsets for new and modified minor sources.
10) Increase the ratio of emission offsets required for new sources.
11) Require VOC or NO_x controls on new minor sources (less than 100 tons).

No contingency measure shall be implemented without providing the opportunity for full public participation during which the relative costs and benefits of individual measures, at the time they are under consideration, can be fully evaluated. IDEM expects that the additional statewide VOC measures being adopted by Indiana and the other MRPO States as discussed in Section 6.1 will provide for a margin of safety over and above the modeled future year design values illustrated in Section 7.

9.0 PUBLIC PARTICIPATION

Indiana published notification for a public hearing and solicitation for public comment concerning the draft Redesignation Petition and Maintenance Plan in The Indianapolis Star/News, Indianapolis, Indiana, The Reporter Times, Martinsville, Indiana, Shelbyville News, Shelbyville, Indiana and the Anderson Herald Bulletin, Anderson, Indiana on February 1, 2007.

A public hearing to receive comments on the redesignation request was conducted on March 6, 2007 in Indiana Government Center South, Conference Room 6, 402 West Washington Street, Indianapolis, Indiana. The public comment period closed on March 9, 2007. No comments were received during the public comment period. Appendix E includes a copy of the public notice, certifications of publication, and the transcript from the public hearing.

10.0 CONCLUSIONS

The Central Indiana Area has attained the NAAQS standard for ozone. This petition demonstrates that the Central Indiana Area has complied with the applicable provisions of the 1990 Amendments to the Clean Air Act regarding redesignation of ozone nonattainment areas. IDEM has prepared a State Implementation and Maintenance Plan that meets the requirement of Section 110 (a)(1) of the 1990 Clean Air Act.

Indiana has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures and that additional significant regional NO_x reductions following implementation of Phase II NO_x and CAIR will ensure continued compliance (maintenance) with the standard. Based on this presentation, the Central Indiana Area Ozone Basic Nonattainment

Area meets the requirements for redesignation under the CAA and U.S. EPA guidance. Furthermore, because this area is subject to significant transport of pollutants, significant regional NO_x reductions will ensure continued compliance (maintenance) with the standards with an increasing margin of safety.

Consistent with the authority granted to the U.S. EPA, the State of Indiana hereby requests that the Central Indiana Area Ozone Basic Nonattainment Area be redesignated to attainment simultaneously with U.S. EPA approval of the Indiana State Implementation and Maintenance Plan provisions contained herein.

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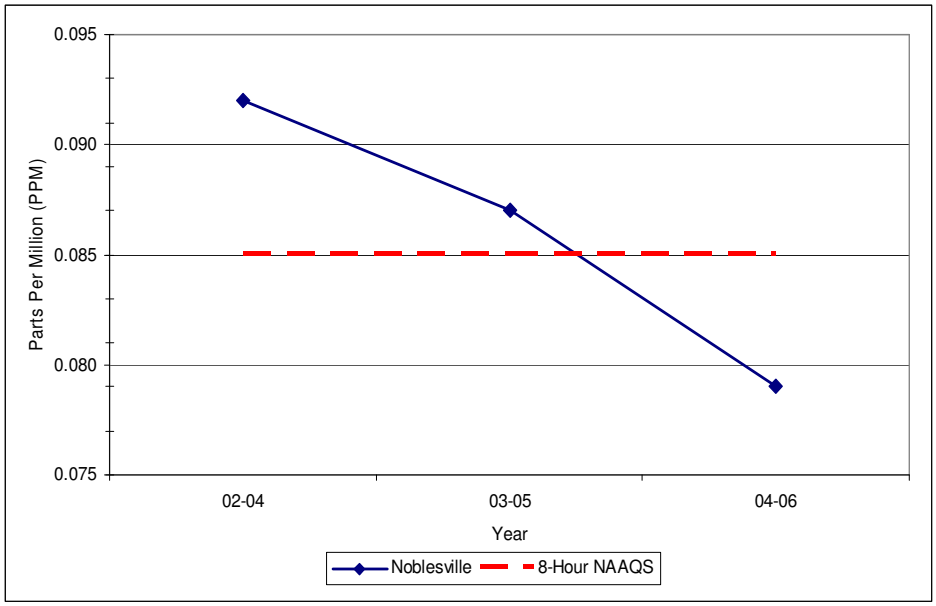
APPENDIX A

Aerometric Information Retrieval System (AIRS) Data

AIRS ID	COUNTY	SITE NAME	YEAR	1st	2nd	3rd	4th	04-06 Design Value
18-011-0001	Boone	Whitestown	2004	0.089	0.081	0.073	0.072	
18-011-0001	Boone	Whitestown	2005	0.088	0.083	0.082	0.082	
18-011-0001	Boone	Whitestown	2006	0.088	0.082	0.080	0.080	0.078
18-057-1001	Hamilton	Noblesville	2004	0.079	0.077	0.076	0.075	
18-057-1001	Hamilton	Noblesville	2005	0.098	0.092	0.090	0.087	
18-057-1001	Hamilton	Noblesville	2006	0.085	0.080	0.080	0.077	0.079
18-059-0003	Hancock	Fortville	2004	0.077	0.073	0.073	0.072	
18-059-0003	Hancock	Fortville	2005	0.088	0.082	0.081	0.080	
18-059-0003	Hancock	Fortville	2006	0.081	0.077	0.077	0.075	0.075
18-063-0004	Hendricks	Avon	2004	0.075	0.073	0.071	0.071	
18-063-0004	Hendricks	Avon	2005	0.087	0.081	0.079	0.078	
18-063-0004	Hendricks	Avon	2006	0.079	0.075	0.073	0.073	0.074
18-081-0002	Johnson	Trafalgar	2004	0.079	0.075	0.074	0.073	
18-081-0002	Johnson	Trafalgar	2005	0.091	0.080	0.079	0.077	
18-081-0002	Johnson	Trafalgar	2006	0.081	0.080	0.078	0.078	0.076

AIRS ID	COUNTY	SITE NAME	YEAR	1st	2nd	3rd	4th	04-06 Design Value
18-095-0010	Madison	Emporia	2004	0.077	0.072	0.072	0.072	
18-095-0010	Madison	Emporia	2005	0.090	0.083	0.078	0.078	
18-095-0010	Madison	Emporia	2006	0.079	0.076	0.074	0.073	0.074
18-097-0050	Marion	Ft. Benjamin Harrison	2004	0.074	0.074	0.074	0.073	
18-097-0050	Marion	Ft. Benjamin Harrison	2005	0.087	0.082	0.081	0.080	
18-097-0050	Marion	Ft. Benjamin Harrison	2006	0.079	0.078	0.078	0.076	0.076
18-097-0057	Marion	Harding Street	2004	0.070	0.068	0.066	0.066	
18-097-0057	Marion	Harding Street	2005	0.089	0.084	0.082	0.081	
18-097-0057	Marion	Harding Street	2006	0.082	0.077	0.076	0.076	0.074
18-097-0042	Marion	Mann Road	2004	0.071	0.068	0.068	0.065	
18-097-0042	Marion	Mann Road	2005	0.083	0.081	0.077	0.076	
18-097-0042	Marion	Mann Road	2006	0.082	0.078	0.075	0.074	0.071
18-097-0073	Marion	Naval Air Warfare Center	2004	0.075	0.075	0.073	0.071	
18-097-0073	Marion	Naval Air Warfare Center	2005	0.082	0.081	0.081	0.080	
18-097-0073	Marion	Naval Air Warfare Center	2006	0.078	0.073	0.073	0.072	0.074
18-097-0005	Morgan	Monrovia	2004	0.075	0.073	0.072	0.072	
18-097-0005	Morgan	Monrovia	2005	0.084	0.081	0.081	0.078	
18-097-0005	Morgan	Monrovia	2006	0.079	0.077	0.077	0.077	0.075
18-145-0001	Shelby	Fairland	2004	0.079	0.073	0.071	0.071	
18-145-0001	Shelby	Fairland	2005	0.084	0.083	0.082	0.080	
18-145-0001	Shelby	Fairland	2006	0.079	0.077	0.075	0.073	0.074

Site #	Site Name	Three Year 8-hr Design Values				
		00-02	01-03	02-04	03-05	04-06
18-011-0001	Whitestown	0.088	0.090	0.086	0.080	0.078
18-057-1001	Noblesville	0.093	0.096	0.092	0.087	0.079
18-059-0003	Fortville	0.092	0.094	0.088	0.081	0.075
18-063-0004	Avon	0.088	0.085	0.081	0.076	0.074
18-081-0002	Trafalgar	0.087	0.086	0.083	0.076	0.076
18-095-0010	Emporia	0.091	0.095	0.089	0.080	0.074
18-097-0050	Ft. Benjamin Harrison	0.090	0.092	0.088	0.081	0.076
18-097-0057	Harding Street	0.086	0.085	0.080	0.074	0.074
18-097-0042	Mann Road	0.084	0.081	0.077	0.071	0.071
18-097-0073	Naval Air Warfare Center	0.089	0.089	0.086	0.077	0.074
18-109-0005	Monrovia	0.088	0.085	0.082	0.077	0.075
18-145-0001	Fairland	0.093	0.094	0.087	0.080	0.074



Site #	Site Name	Yearly Annual 8-hr Values											
		1995	1996	1997	1998	1999	2000	2001	2002*	2003	2004	2005	2006
18-011-0001	Whitestown	Site Started in April 2000					0.082	0.084	0.099	0.088	0.072	0.082	0.080
18-057-1001	Noblesville	0.096	0.101	0.095	0.100	0.096	0.090	0.088	0.101	0.101	0.075	0.087	0.077
18-059-0003	Fortville	0.097	0.100	0.088	0.094	0.094	0.086	0.089	0.101	0.092	0.072	0.080	0.075
18-063-0004	Avon	Site Started in April 2000					0.087	0.083	0.095	0.079	0.071	0.078	0.073
18-081-0002	Trafalgar	Site Started in April 1997		0.084	0.090	0.095	0.084	0.082	0.097	0.080	0.073	0.077	0.078
18-095-0010	Emporia	0.095	0.098	0.082	0.097	0.093	0.080	0.090	0.104	0.091	0.072	0.078	0.073
18-097-0050	Ft. Benjamin Harrison	0.099	0.096	0.090	0.095	0.096	0.083	0.087	0.100	0.091	0.073	0.080	0.076
18-097-0057	Harding Street	0.091	0.096	0.085	0.087	0.094	0.078	0.081	0.099	0.075	0.066	0.081	0.076
18-097-0042	Mann Road	0.089	0.092	0.084	0.092	0.090	0.082	0.078	0.093	0.074	0.065	0.076	0.074
18-097-0073	Naval Air Warfare Center	0.091	0.090	0.086	0.093	0.096	0.082	0.079	0.106	0.082	0.071	0.080	0.072
18-109-0005	Monrovia	Site Started in April 1997		0.088	0.090	0.093	0.088	0.082	0.094	0.081	0.072	0.078	0.077
18-145-0001	Fairland	Site Started in April 2000					0.087	0.093	0.101	0.089	0.071	0.080	0.073

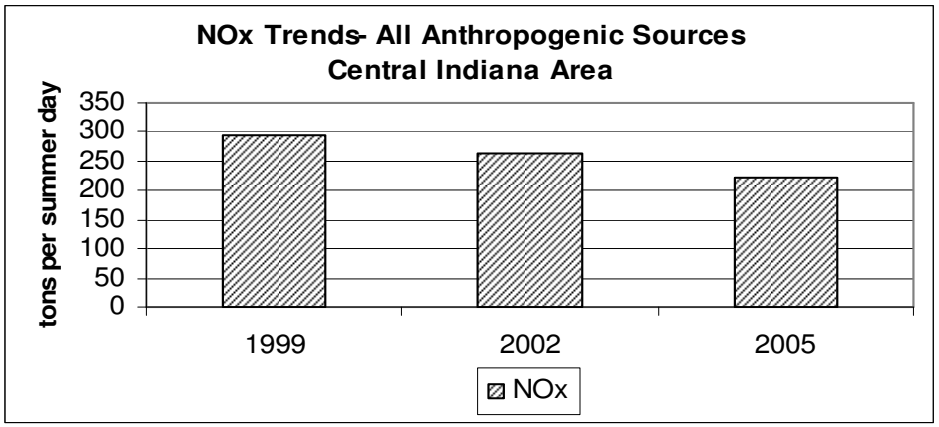
*2002 represents the highest annual average for most sites.

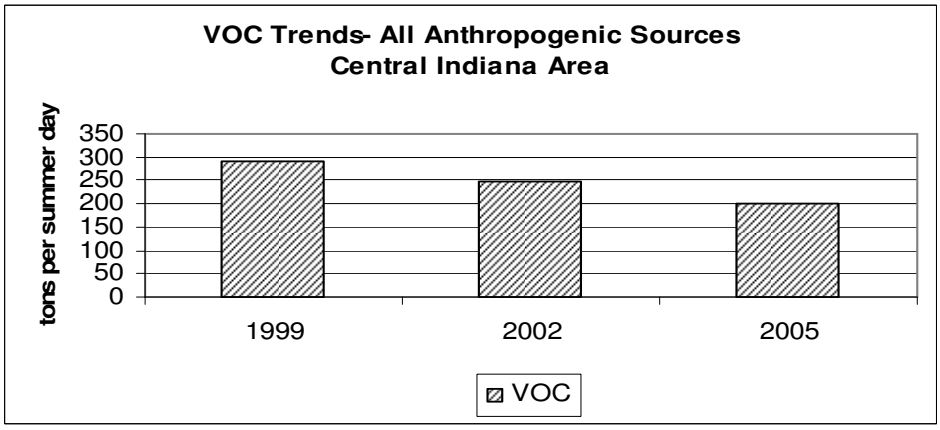
APPENDIX B

Emissions Inventories

TOTAL

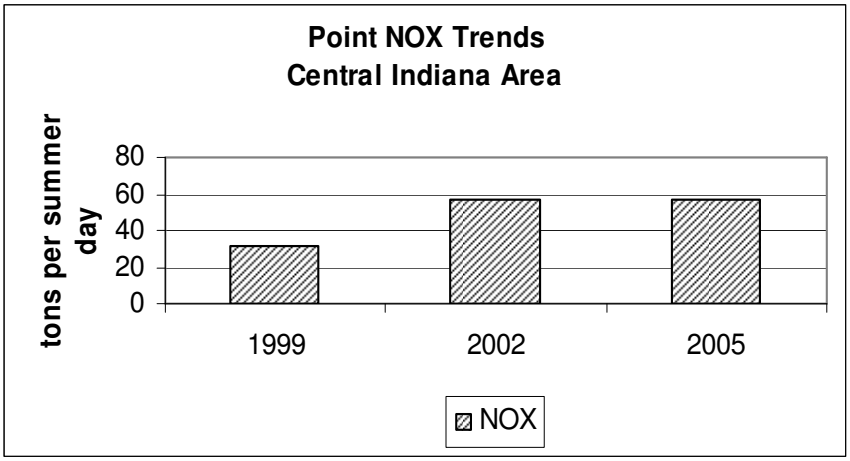
Year	NOX	VOC
1999	293.15	290.84
2002	264.69	249.67
2005	220.18	199.25

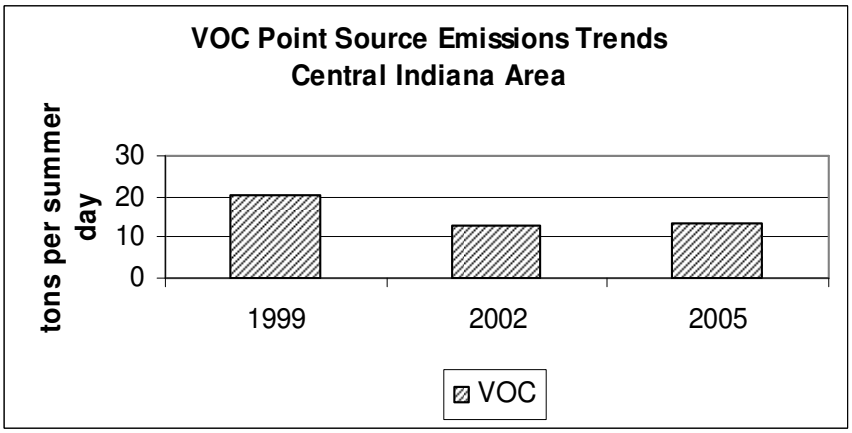




POINT

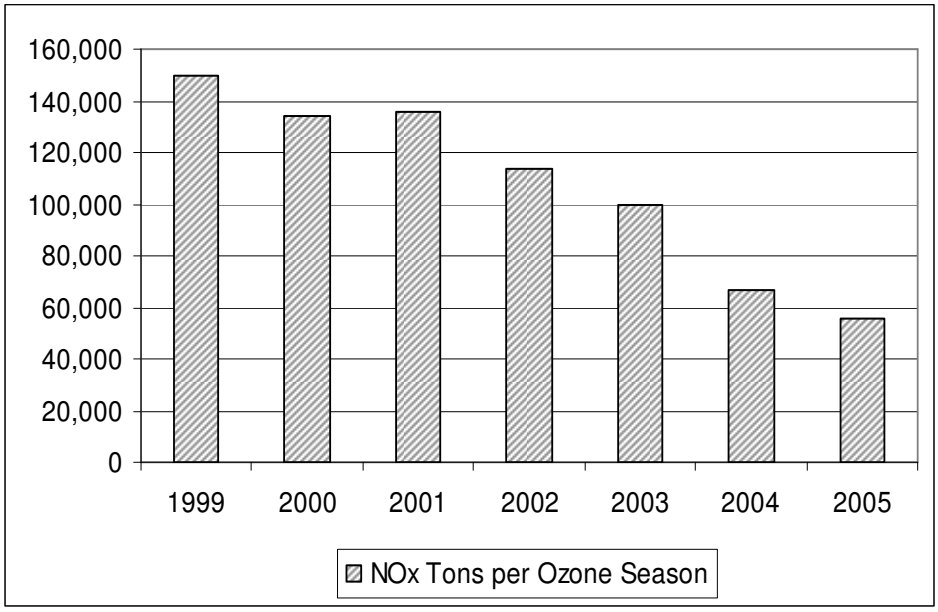
Year	NOX	VOC
1999	31.28	20.22
2002	57.49	13.06
2004	56.63	13.54





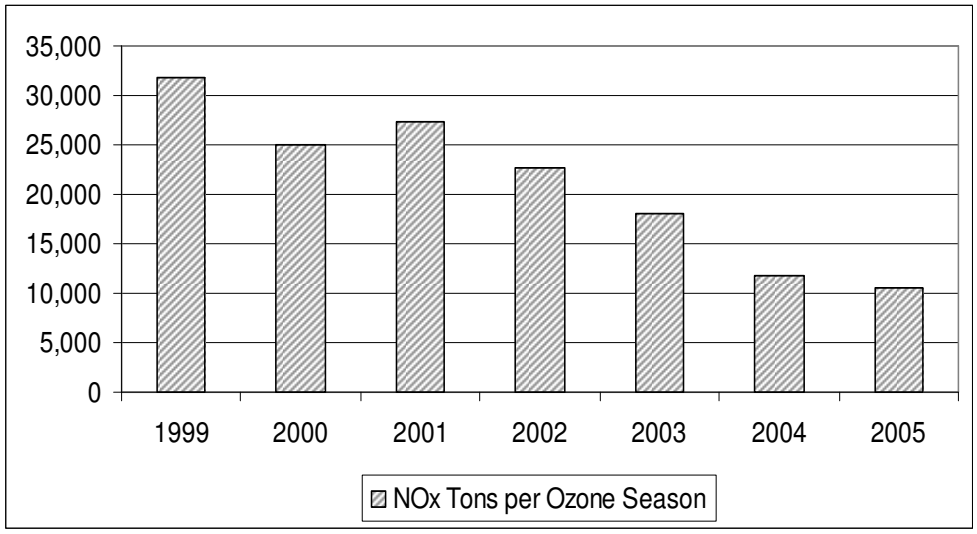
STATEWIDE EGU NOx TRENDS

Year	NOx Tons per Ozone Season
1997	152,834
1998	159,931
1999	149,827
2000	133,881
2001	136,052
2002	113,996
2003	99,283
2004	66,568
2005	55,486



Central Indiana EGU NOx Trends

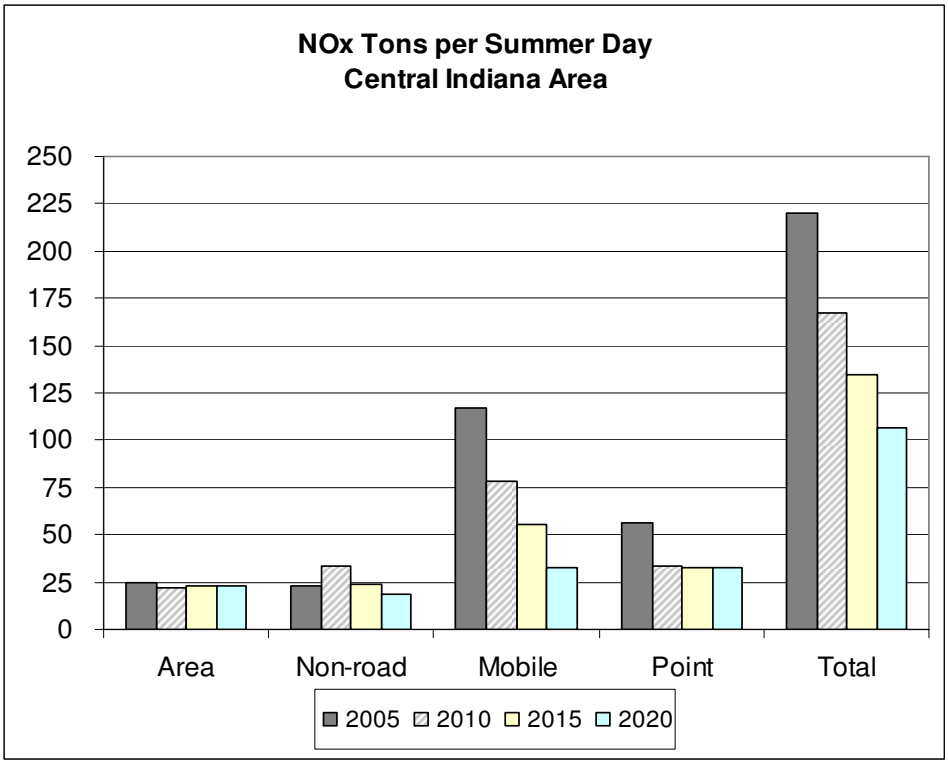
Year	NOX Tons per Ozone Season
1999	31,815
2000	25,028
2001	27,394
2002	22,661
2003	17,984
2004	11,798
2005	10,591

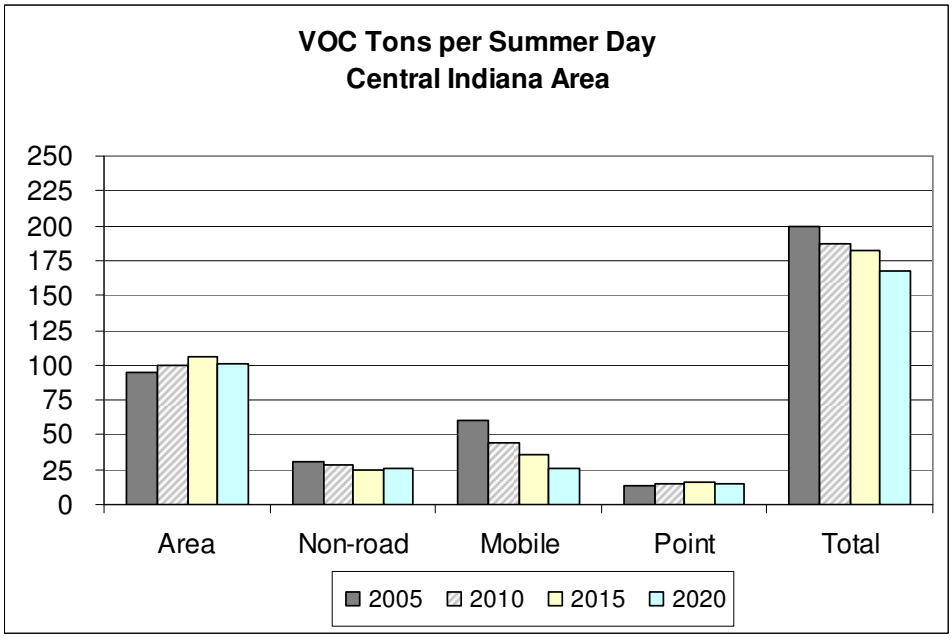


APPENDIX C

2010, 2015 and 2020 Projected Emissions Inventories

Sector	Nox 2005	Nox 2010	Nox 2015	Nox 2020
Area	24.26	22.39	23.12	22.74
Non-road	22.55	33.05	24.06	18.36
Mobile	116.74	78.40	55.42	32.45
Point	56.63	33.31	32.41	32.77
Total	220.18	167.15	135.01	106.31
Sector	**VOC**	**VOC**	**VOC**	**VOC**
Area	94.85	99.29	106.31	100.81
Non-road	30.36	28.77	24.06	25.29
Mobile	60.50	44.19	35.33	26.47
Point	13.54	14.34	16.00	14.85
Total	199.25	186.58	181.69	167.42


NOx Tons per Summer Day
Central Indiana Area
250
225
200
175
150
125
100
75
50
25
0
Area
Non-road
Mobile
Point
Total
2005
2010
2015
2020


VOC Tons per Summer Day
Central Indiana Area
250
225
200
175
150
125
100
75
50
25
0
Area
Non-road
Mobile
Point
Total
2005
2010
2015
2020

APPENDIX D

Public Participation Documentation

Public Participation Files Attached

APPENDIX E

Mobile Input/Output and Calculation Files,
Central Indiana Area

Mobile Input/Output and Calculation Files Attached

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